

# Forests, Water and People

## Drinking water supply and forest lands in Indiana

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 Indiana. For more detailed description of methods, and results for the Northeast and Midwest United States, see the [full report](#).

### The Process

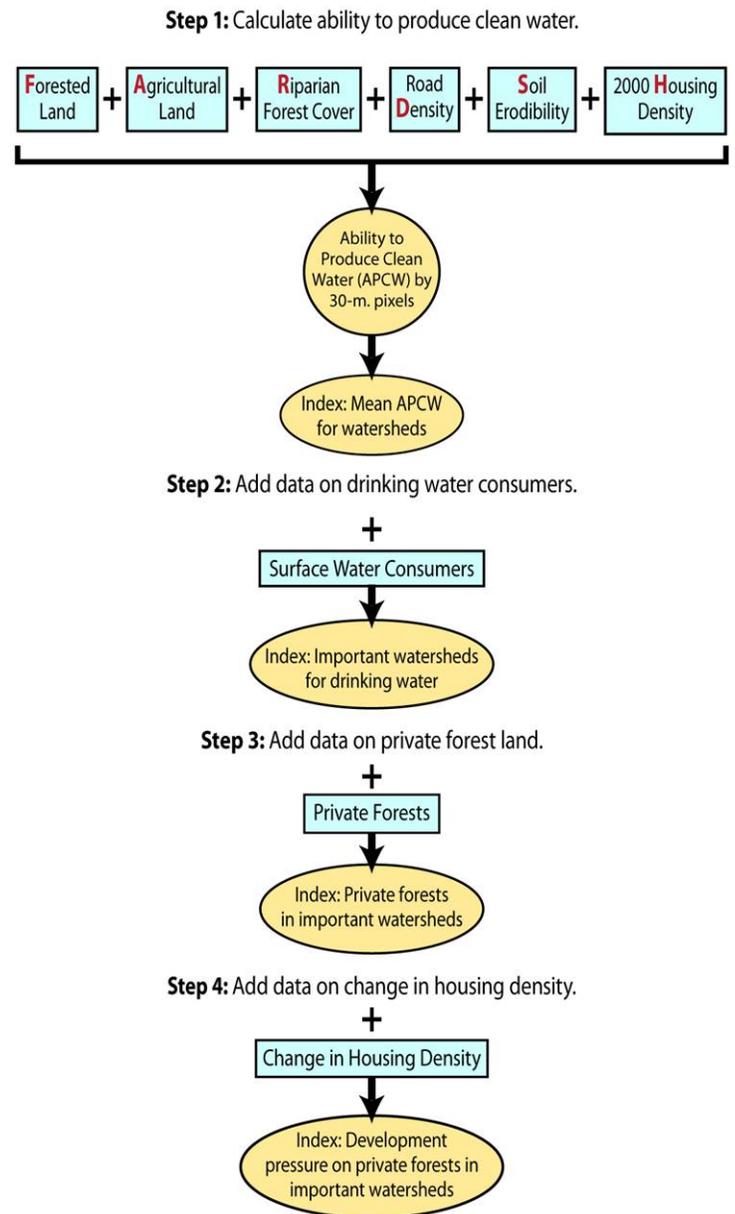
Through a 4 step GIS-based overlay analysis, four indices were developed for each watershed (see Figure 1).



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.



## Indiana Results

### Highlights

- Indiana’s 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 Indiana’s 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 Indiana 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 East Fork White and Lower Ohio-Bay watersheds.
- Indiana 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 Upper White (serving 951,517) and Silver-Little Kentucky (serving 250,000) watersheds.
- Although there is a low percent of forested land statewide, approximately 86 percent of forested lands are privately owned and therefore subject to development. The Middle Ohio-Laughery, Lower East Fork White, and St. Joseph watersheds ranked highest in step 3.
- Although there is a low percent of forested land statewide, 13 percent of private forestlands on high-quality watershed areas are subject to development pressure by 2030. However, the Middle Ohio-Laughery watershed ranked in the top 16 percent of all the region’s watersheds because this watershed is at high risk for development and also provides high-quality drinking water to a large population.

**Table 1.** Watershed results for Indiana

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 Ohio-Laughery	05090203	4 of 10	61,059	44 %	21 %	28 of 40	88 of 540
Lower East Fork White	05120208	5 of 10	98,360	31 %	9 %	24 of 40	169 of 540
St. Joseph	04100003	2 of 10	250,000	15 %	17 %	23 of 40	199 of 540
Silver-Little Kentucky	05140101	4 of 10	9,450	42 %	18 %	23 of 40	199 of 540
Blue-Sinking	05140104	5 of 10	0	37 %	18 %	22 of 40	229 of 540
Patoka	05120209	3 of 10	35,639	28 %	8 %	22 of 40	229 of 540
Upper White	05120201	1 of 10	951,517	11 %	19 %	22 of 40	229 of 540
Muscatatuck	05120207	3 of 10	17,614	26 %	13 %	21 of 40	264 of 540
Highland-Pigeon	05140202	1 of 10	162,812	15 %	8 %	20 of 40	289 of 540
St. Joseph	04050001	4 of 10	0	21 %	18 %	19 of 40	320 of 540
Lower White	05120202	3 of 10	3,757	26 %	11 %	18 of 40	337 of 540
Whitewater	05080003	1 of 10	43,540	21 %	9 %	18 of 40	337 of 540
Wildcat	05120107	1 of 10	56,498	4 %	11 %	17 of 40	352 of 540
Lower Ohio-Bay	05140203	6 of 10	3,462	37 %	1 %	17 of 40	352 of 540
Upper East Fork White	05120206	1 of 10	13,100	17 %	12 %	17 of 40	352 of 540
Little Calumet-Galien	04040001	3 of 10	0	31 %	11 %	17 of 40	352 of 540
Eel	05120203	1 of 10	2,650	19 %	18 %	17 of 40	352 of 540
Lower Ohio-Little Pigeon	05140201	3 of 10	1,772	34 %	6 %	17 of 40	352 of 540
Upper Great Miami, Indiana, Ohio	05080001	1 of 10	58,606	9 %	17 %	17 of 40	352 of 540
Auglaize	04100007	1 of 10	89,345	7 %	6 %	16 of 40	380 of 540
Middle Wabash-Busseron	05120111	4 of 10	9,077	21 %	3 %	16 of 40	380 of 540
Kankakee	07120001	3 of 10	43,789	10 %	7 %	16 of 40	380 of 540
Flatrock-Haw	05120205	1 of 10	11,500	5 %	10 %	15 of 40	394 of 540
Eel	05120104	1 of 10	12,861	10 %	12 %	15 of 40	394 of 540
Driftwood	05120204	1 of 10	0	7 %	19 %	14 of 40	407 of 540
Sugar	05120110	2 of 10	0	11 %	12 %	14 of 40	407 of 540
Chicago	07120003	2 of 10	0	11 %	11 %	14 of 40	407 of 540
Lower Great Miami, Indiana, Ohio	05080002	1 of 10	0	16 %	17 %	14 of 40	407 of 540
Middle Wabash-Little Vermilion	05120108	3 of 10	0	16 %	5 %	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)
Upper Wabash	05120101	1 of 10	11,520	8 %	9 %	13 of 40	427 of 540
St. Marys	04100004	1 of 10	0	7 %	14 %	13 of 40	427 of 540
Tippecanoe	05120106	2 of 10	0	9 %	7 %	12 of 40	442 of 540
Upper Maumee	04100005	1 of 10	0	6 %	11 %	12 of 40	442 of 540
Little Wabash	05120114	1 of 10	59,422	16 %	1 %	11 of 40	454 of 540
Vermilion	05120109	2 of 10	39,502	5 %	2 %	11 of 40	454 of 540
Middle Wabash-Deer	05120105	1 of 10	0	6 %	7 %	10 of 40	465 of 540
Lower Wabash	05120113	1 of 10	1,058	15 %	3 %	10 of 40	465 of 540
Salamonie	05120102	1 of 10	0	7 %	3 %	9 of 40	484 of 540
Mississinewa	05120103	1 of 10	0	7 %	4 %	9 of 40	484 of 540
Iroquois	07120002	3 of 10	0	4 %	1 %	8 of 40	498 of 540

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

Mean APCW for watersheds:	2.2	of 10
Important watersheds for drinking water composite score:	5.6	of 20
Private forests in important watersheds composite score:	8.8	of 30
Development pressure on private forests in important watersheds composite score:	16.1	of 40
Forested Land (acres):	7,406,359.7	
Private Forest (acres):	6,365,079.4	
Private Forest Land under Development Pressure by 2030 (acres):	822,425.0	
(% private forest land):	12.9%	

Note: If a watershed fell partially in Indiana, 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).

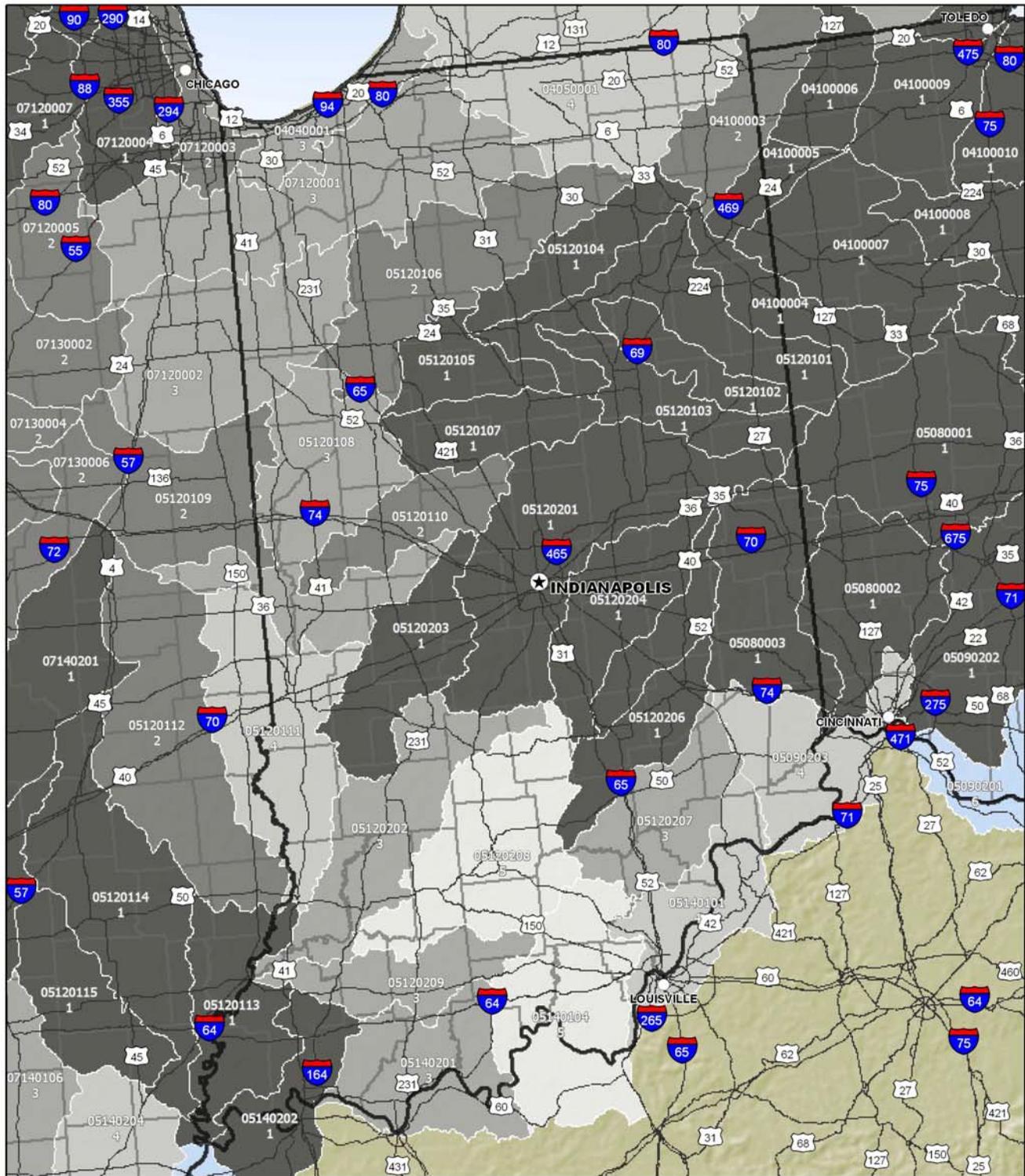
### **Maps**

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.



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

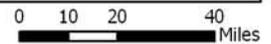


## STEP 1 COMPOSITE SCORE

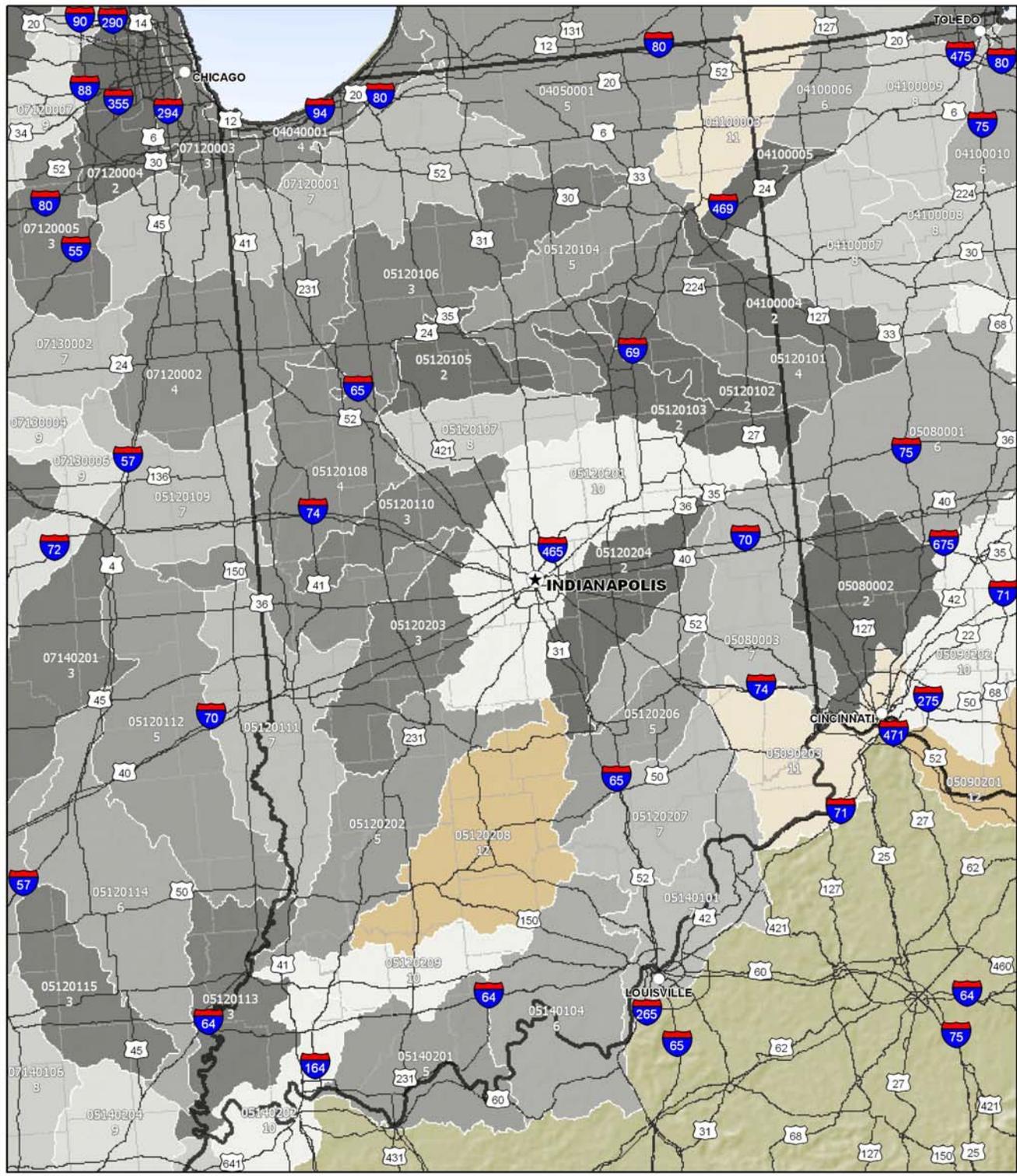


Projection: Albers

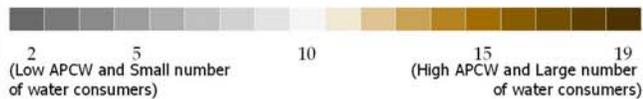
Watershed labels describe the 8-digit hydrologic unit code (HUC) and watershed composite score



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

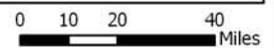


## STEP 2 COMPOSITE SCORE

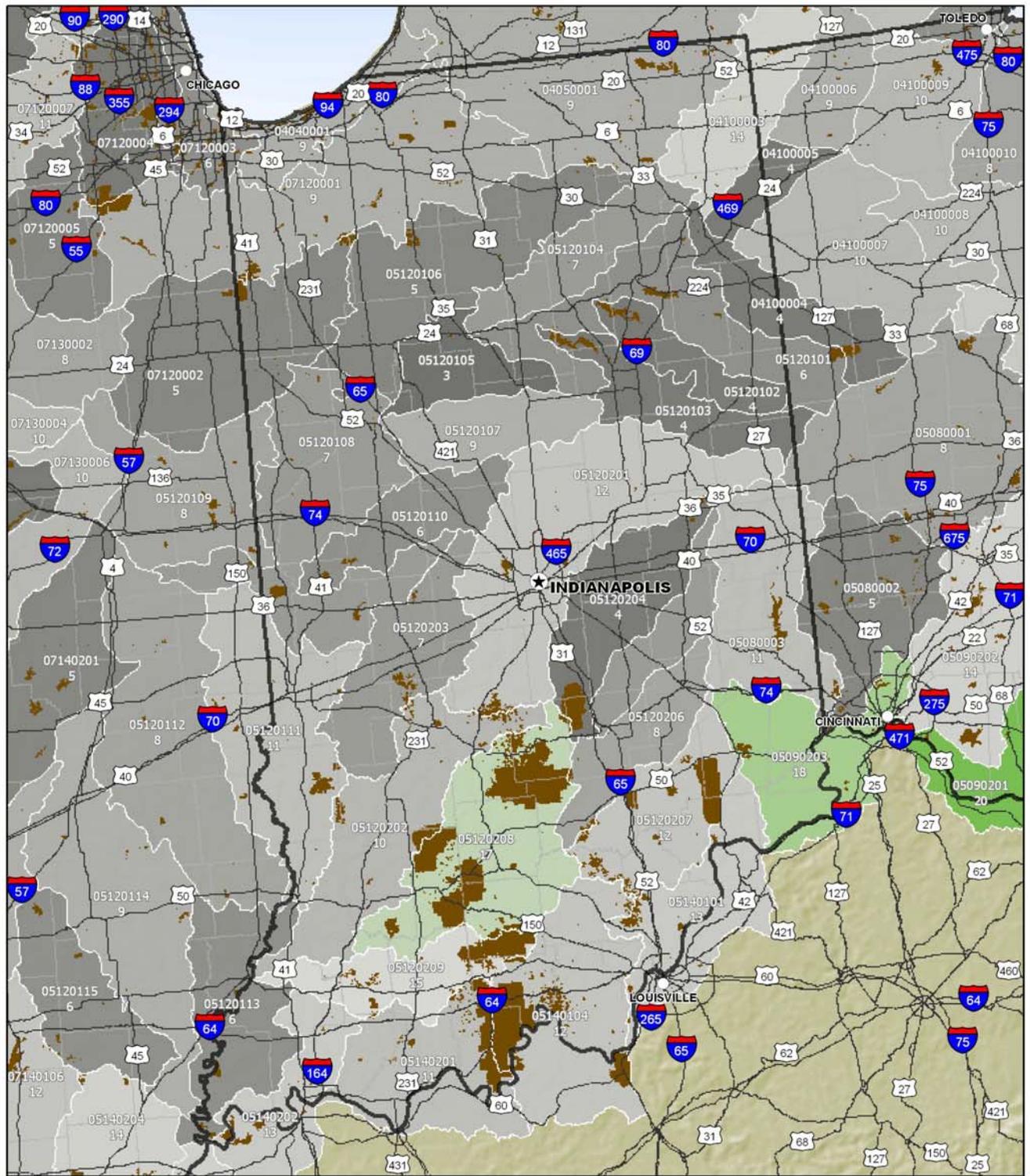


Projection: Albers

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



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

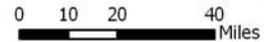


### STEP 3 COMPOSITE SCORE

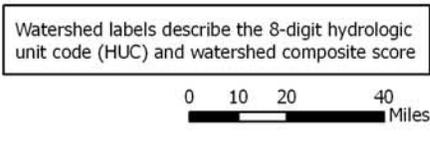
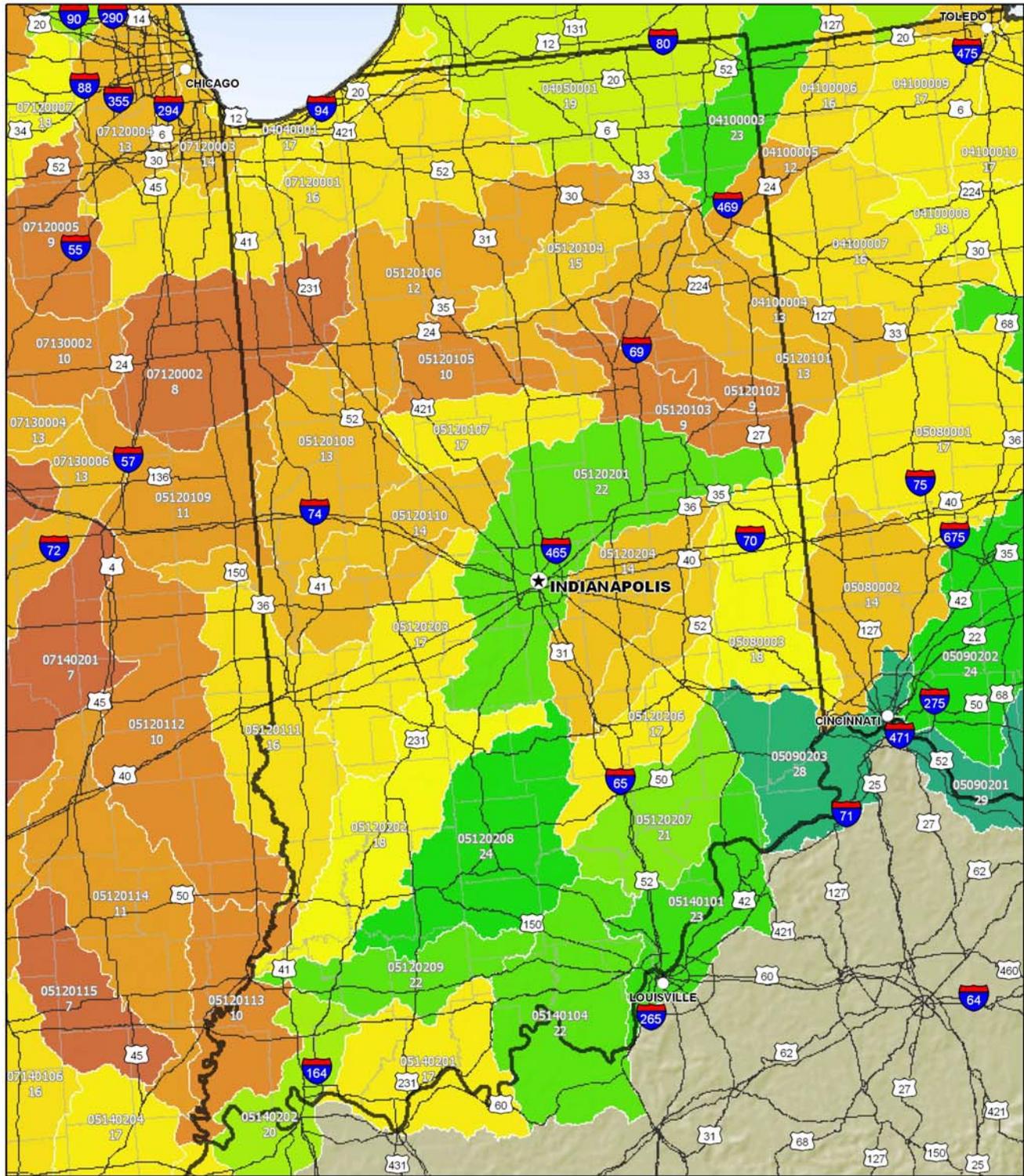


Projection: Albers

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



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



## 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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