



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 30 2009

SUBJECT: Availability of Preliminary Healthy Watersheds Assessments
State-Specific Products

OFFICE OF
WATER

FROM: James Havard, Chief *Jim Havard* Lynda Hall, Chief *Lynda Hall*
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TO: State Contacts for Section 303(d) Programs
State Contacts for Nonpoint Source Programs

CC: EPA Regional Section 303(d) Coordinators, Nonpoint Source Coordinators and Healthy
Watersheds Coordinators

We are pleased to share with you a new product from the Healthy Watersheds program that is intended to support state and partner efforts to identify and protect high quality waters. In recent years, both the Section 303(d) and Section 319 programs have provided greater opportunity for states that wish to prioritize the protection of high quality waters in addition to ongoing efforts to restore impaired waters. Since 2009, the Environmental Protection Agency's (EPA's) Healthy Watersheds program has been supporting protection efforts through science-based documents, analytical frameworks, a Healthy Watersheds Consortium Grant program, and a series of in-depth healthy watersheds assessments completed for individual states and river basins. The Preliminary Healthy Watersheds Assessments (PHWA) project is a next step in a series of actions to provide information, technical assistance and tools to help identify healthy watersheds that may represent good prospects for protection.

The PHWA has developed a set of 48 statewide and 85 ecoregional-scale assessments of watershed health and vulnerability across the conterminous United States. The health assessment provides an index of watershed health for each 12-digit hydrologic unit code (HUC12) watershed that combines six sub-indices, including hydrology, geomorphology, landscape condition, habitat, biological condition and water quality to give an overall score. The vulnerability index incorporates a limited number of potential stressors in three sub-indices: land use change, water use and wildfire risk. Together these indices give a relative picture of watershed health and potential vulnerability across each state and ecoregion.

This transmittal email delivers PHWA results, data, and products specific to your state, along with background information and instructions on ways you can access and tailor this information as desired. Products of the PHWA that are too large to be email attachments are being delivered to each state via a Sharepoint invitation to download, coming to you separately from Doug Norton, Healthy Watersheds Coordinator. The goal of the PHWA is to help our partners better target protection of high quality waters by systematically identifying where healthier and more vulnerable watersheds occur. In particular, the PHWA is designed to:

- Ensure that states and other users have basic, statewide and ecoregional information on watershed condition that can help them communicate and identify opportunities for healthy waters protection in different parts of the state;

- Provide a foundation of nationally available watershed condition data that can be built on and enhanced as improved data become available;
- Support state efforts to implement their protection priorities under the 303(d) Program Vision and/or their nonpoint source pollution program; and
- Support the Clean Water Act goal of maintaining as well as restoring the integrity of waters across the nation.

Development of the PHWA was enabled by the much greater availability in recent years of national level data sets with information relevant to watershed condition and risk across large geographic areas. The PHWA used these national data sources to efficiently generate 48 state assessments in one project. We are available to assist the development of watershed health and vulnerability data for the additional states, territories and tribes upon request and as resources allow.

Attachment 1 contains a summary table of PHWA results for your state. Note that each watershed has been assessed and scored twice: once relative to all watersheds statewide, and once relative to all watersheds in its ecoregion (usually multi-state). In addition to this summary, through invitation to our Sharepoint site we are providing a full set of PHWA materials for each state, including:

- A state-specific ArcGIS file geodatabase containing the PHWA Indicators, Sub-Indices and Indices of health and vulnerability, compiled on the HUC12 scale;
- A user-friendly, state-specific Excel watershed data file also containing the full set of watershed Indicators, Sub-Index and Index values;
- A state-specific set of PHWA watershed health and watershed vulnerability maps, included below as Attachment 2 and also within the watershed data file; and
- An overview document that describes the PHWA purpose, methodology, data sources, limitations, and potential uses (available at <https://www.epa.gov/hwp/healthy-watersheds-integrated-assessment-reports>).

We hope that this PHWA analysis is useful in informing your state's water quality program efforts. Recognizing that the PHWA is a preliminary assessment, we encourage states to amend and improve upon the PHWA as desired, where unique state-specific data may be available. If you have any comments or questions, please contact Doug Norton, Healthy Watersheds Coordinator, at norton.douglas@epa.gov or 202-566-1221.

Attachments:

1. State summary table
2. State map series

PHWA - Summary Findings for Missouri

How many watersheds were assessed, and how did they score?

HUC12 watersheds assessed in state ¹	1,876
HUC12 watersheds in top 25% of statewide <u>and</u> ecoregional health ²	258 (14%)
HUC12 watersheds in top 10% of statewide <u>and</u> ecoregional health ²	92 (5%)

How are the high-scoring watersheds distributed around the state?

HUC12 watersheds by ecoregion (instate only)	<u>Total</u>	<u>Within top 25% HUC12s</u>	
	Instate HUC12s per ecoregion	by Statewide Health Index	by Ecoregional Health Index ³
Ozark Highlands Ecoregion	834	432	225
Central Irregular Plains Ecoregion	589	17	108
Western Corn Belt Plains Ecoregion	150	0	43
Interior River Valleys and Hills Ecoregion	214	20	74
Mississippi Alluvial Plain Ecoregion	83	1	0
Mississippi Valley Loess Plains Ecoregion	6	0	0

How vulnerable are the high-scoring watersheds?

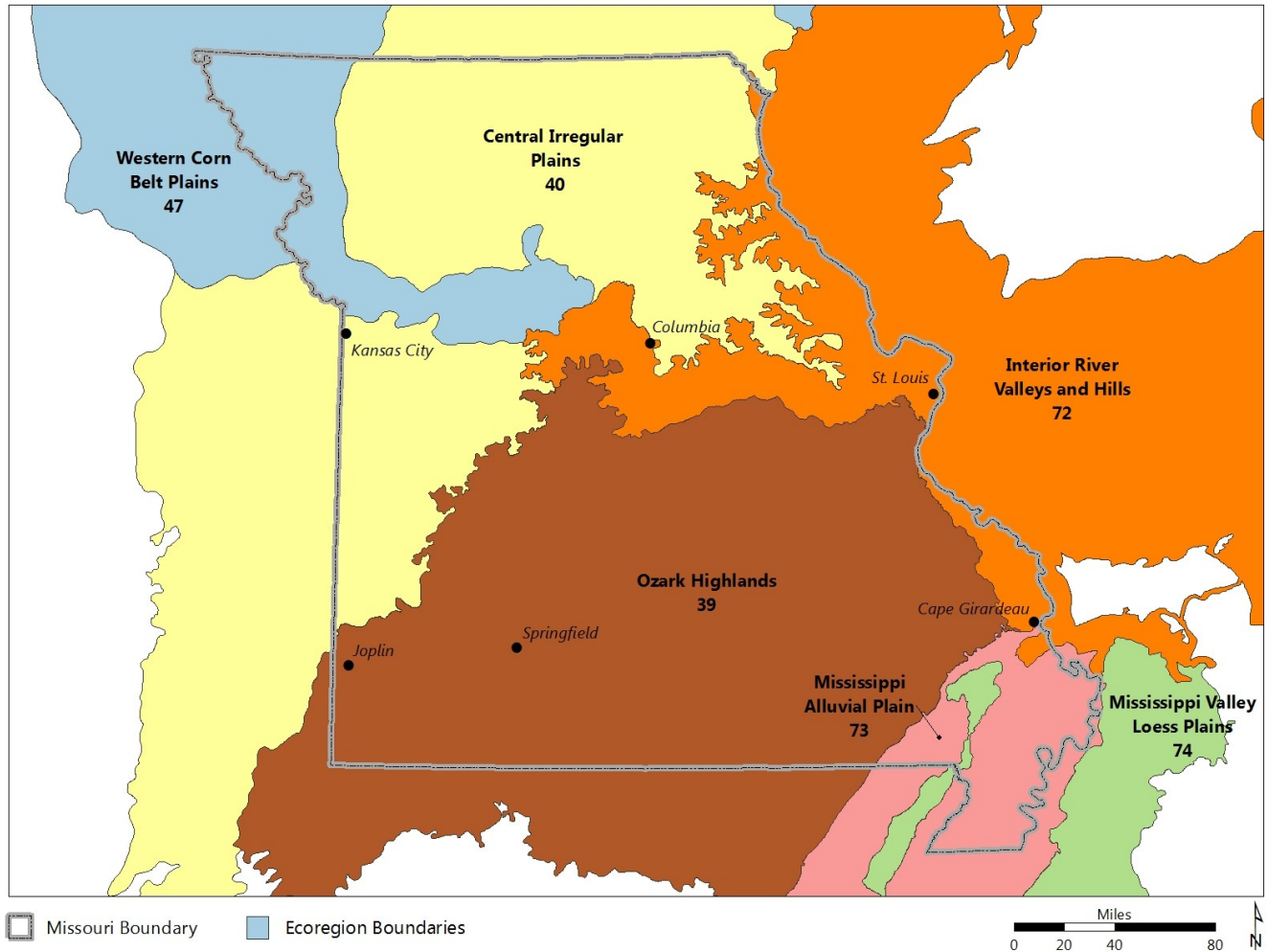
Top 25% HUC12s for watershed health also in top 25% for vulnerability (count and percent)	Statewide
Land Use Change Vulnerability	113 (24%)
Water Use Vulnerability	24 (5%)
Wildfire Vulnerability	257 (55%)

1 - State data summaries include all HUC12s with the majority of their area in-state.

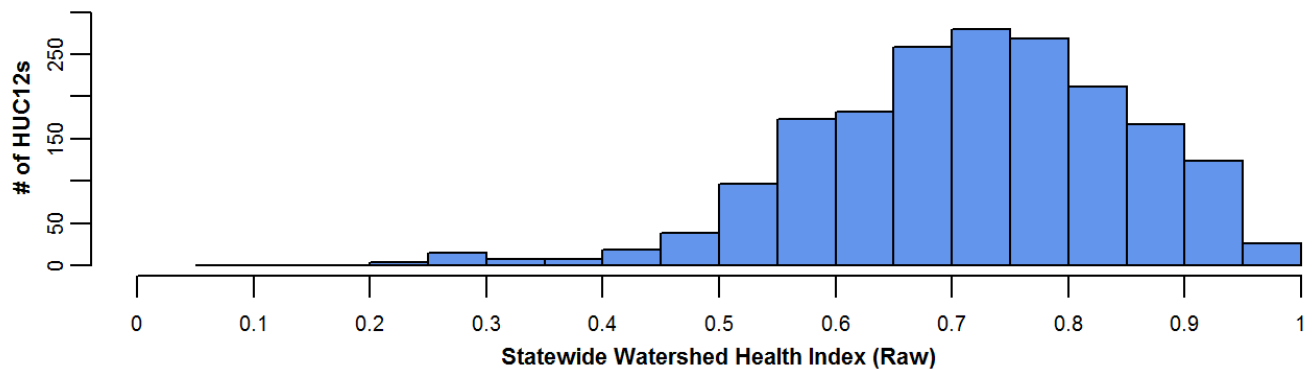
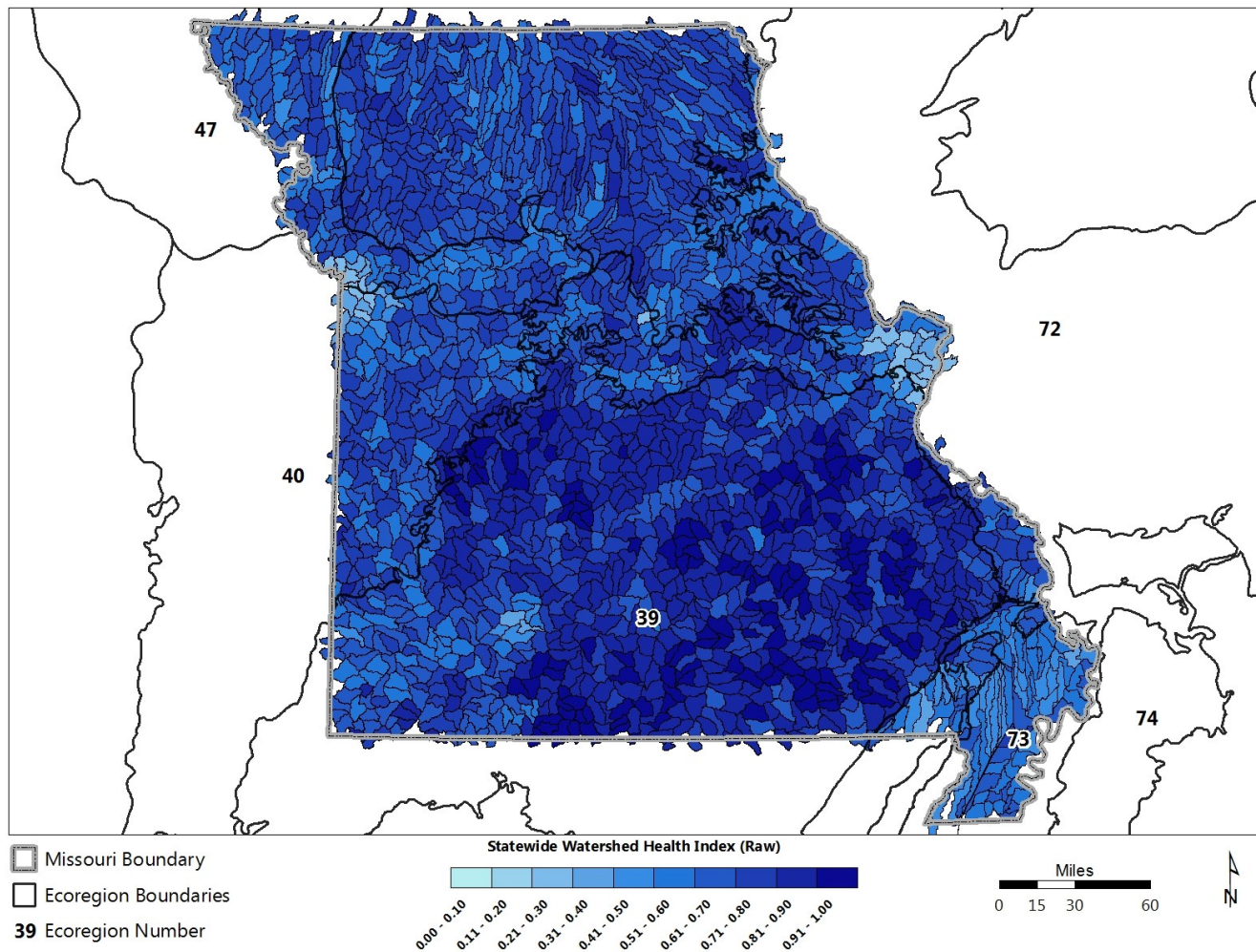
2 - Each HUC12 was scored in two ways: relative to all HUC12s statewide, and relative to all HUC12s ecoregionwide (including in-state and out-of-state ecoregional components). The 10% and 25% thresholds are merely round-number examples and do not represent healthy/unhealthy breakpoints.

3 - This represents a count of in-state HUC12s in the top 25% for their ecoregion's Watershed Health score. Ecoregions generally span multiple states. Often, many of an ecoregion's top 25% HUC12s are out-of-state.

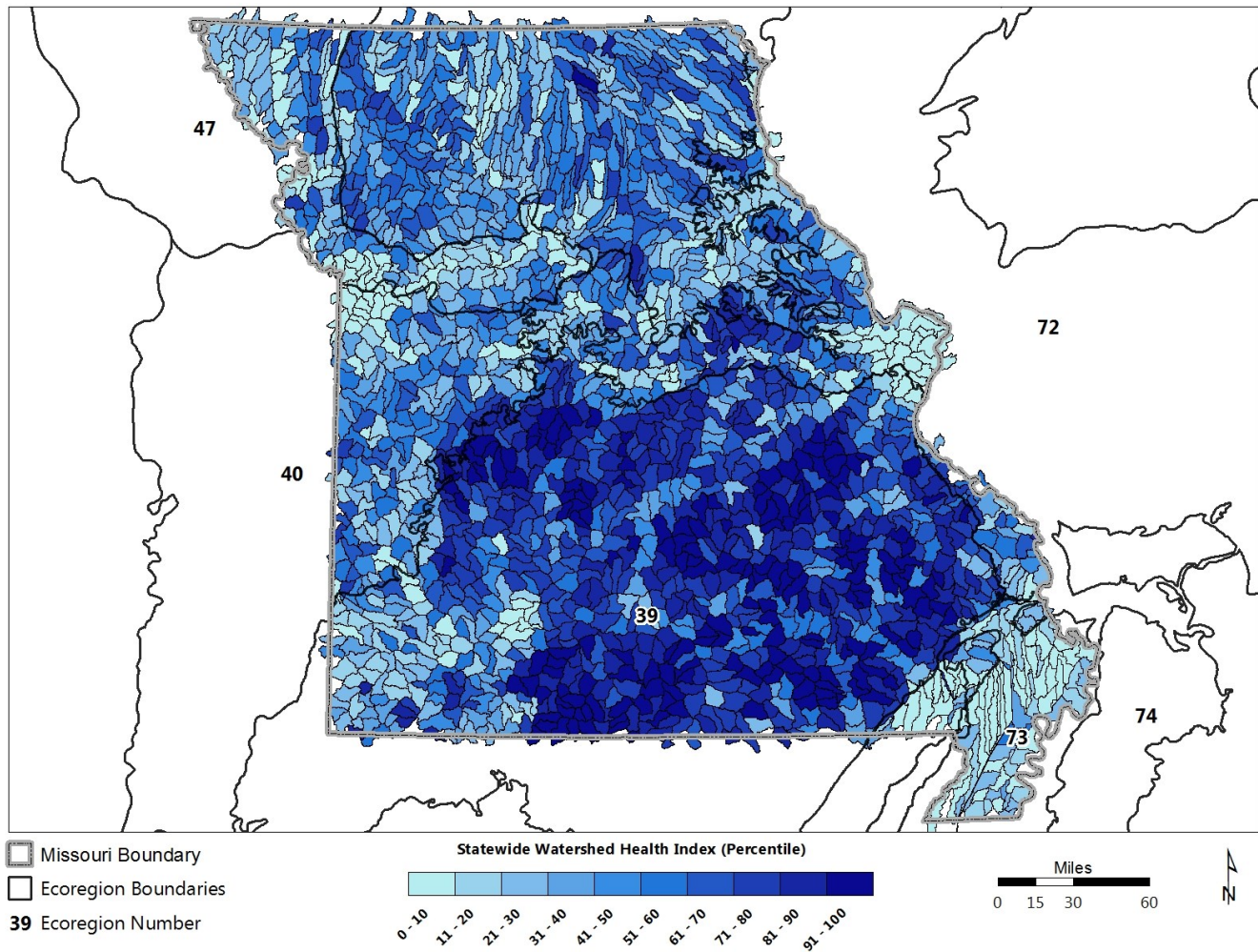
Attachment 2: PHWA Map Series for Missouri



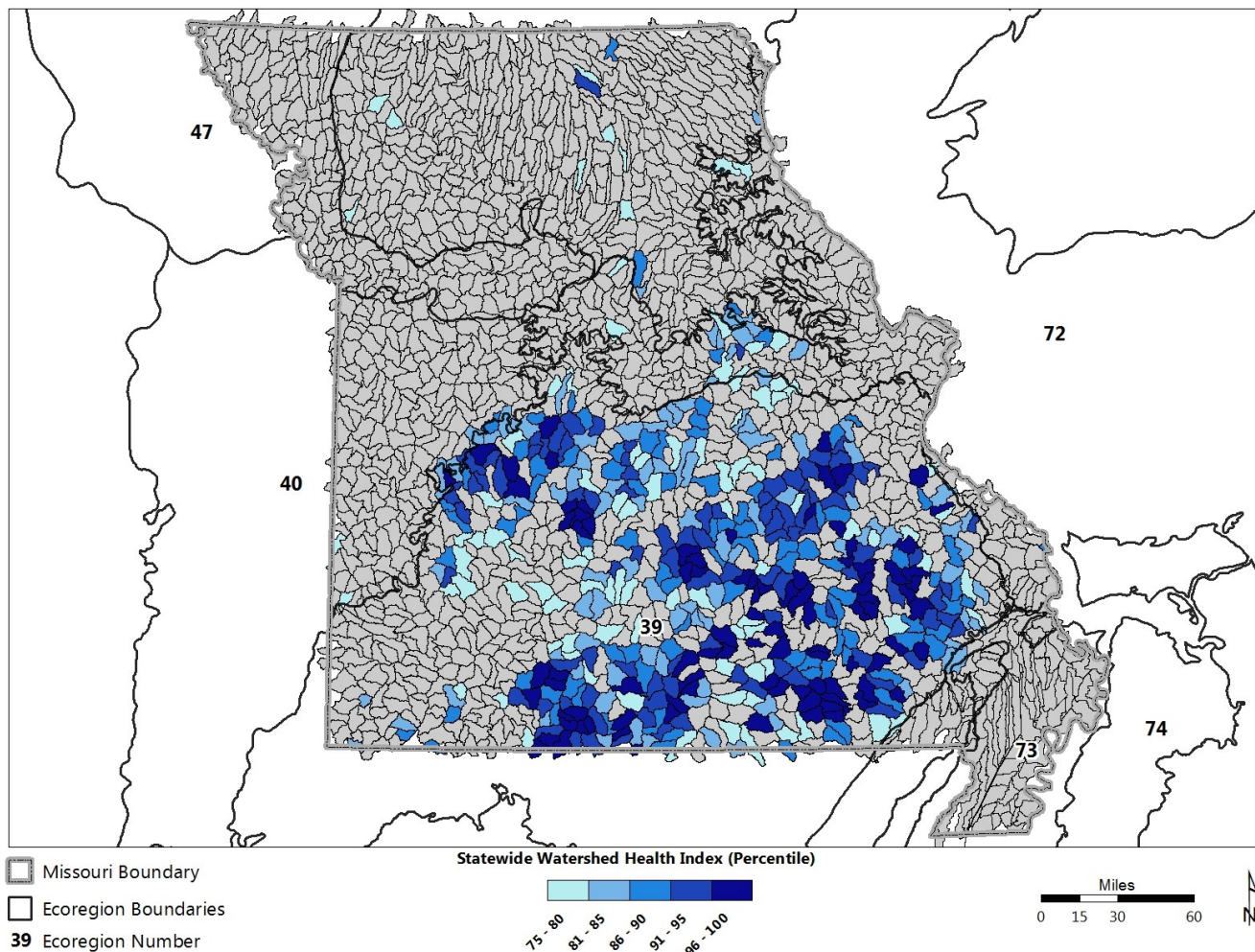
Map 1: State and Level III Omernik Ecoregion (2013) boundaries. The Preliminary Healthy Watersheds Assessment (PHWA) provides watershed health and vulnerability scores at the HUC12 scale (average 36 sq mi in area), both statewide and ecoregion-wide. Major cities are included to help orient map users.



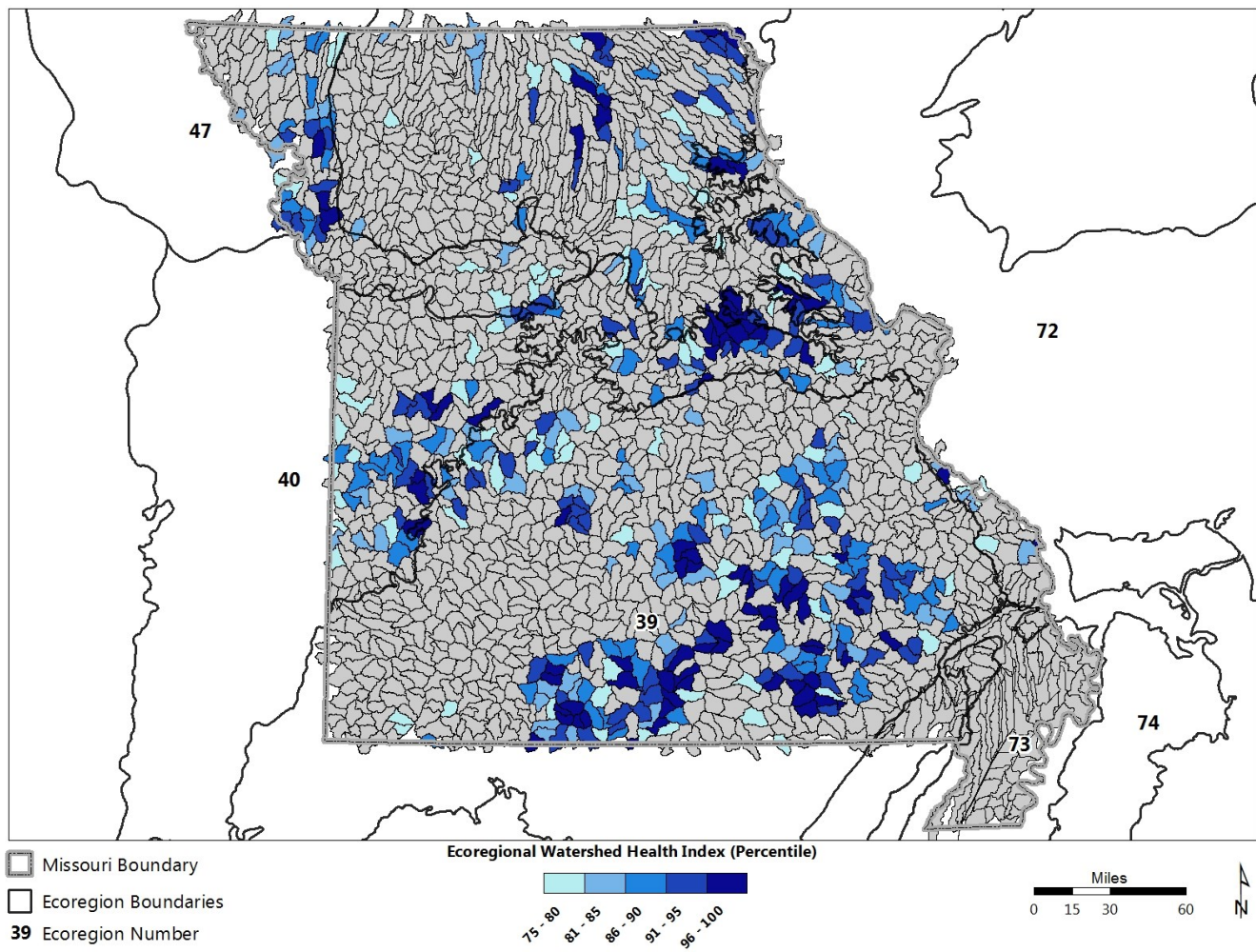
Map 2: Statewide Watershed Health Index raw scores. Each HUC12 is scored relative to all HUC12s statewide within a potential maximum range of 0 to 1. The legend's color breaks represent 10 equal intervals of the raw score range that contain unequal numbers of HUCs; the histogram shows the distribution of statewide Watershed Health Index scores. Statewide relative scoring is useful for identifying location and relative abundance of healthier watersheds (darker blue areas), but does not specify exact thresholds of condition such as healthy or unhealthy.



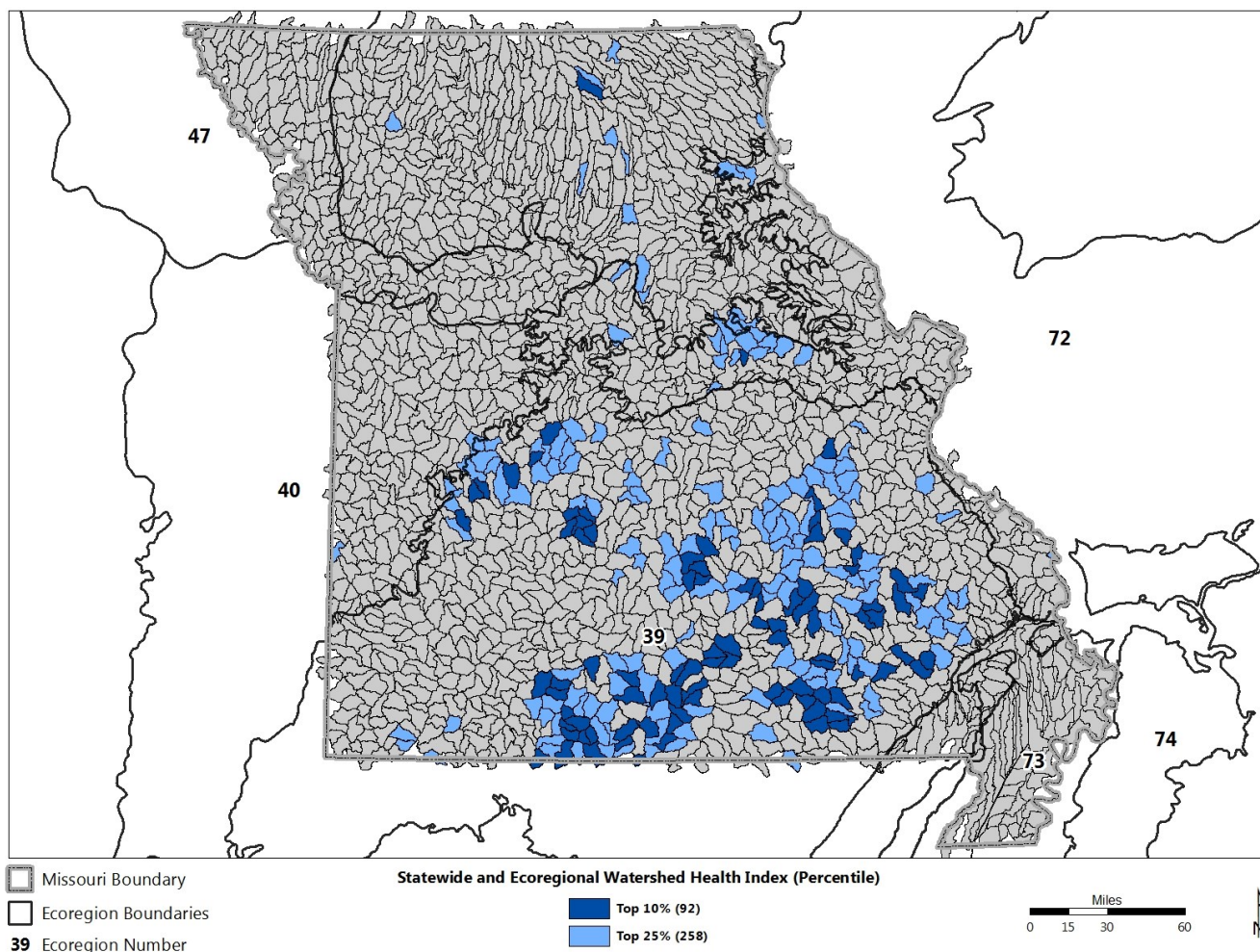
Map 3: Statewide Watershed Health Index HUC12 scores (as in Map 2) plotted using 10 percentile intervals (deciles). Each decile contains the same number of HUC12s. Higher decile values (darker blue) indicate healthier watersheds. Mapping by percentile offers an opportunity to focus on a specific proportion of a state's relatively healthier watersheds.



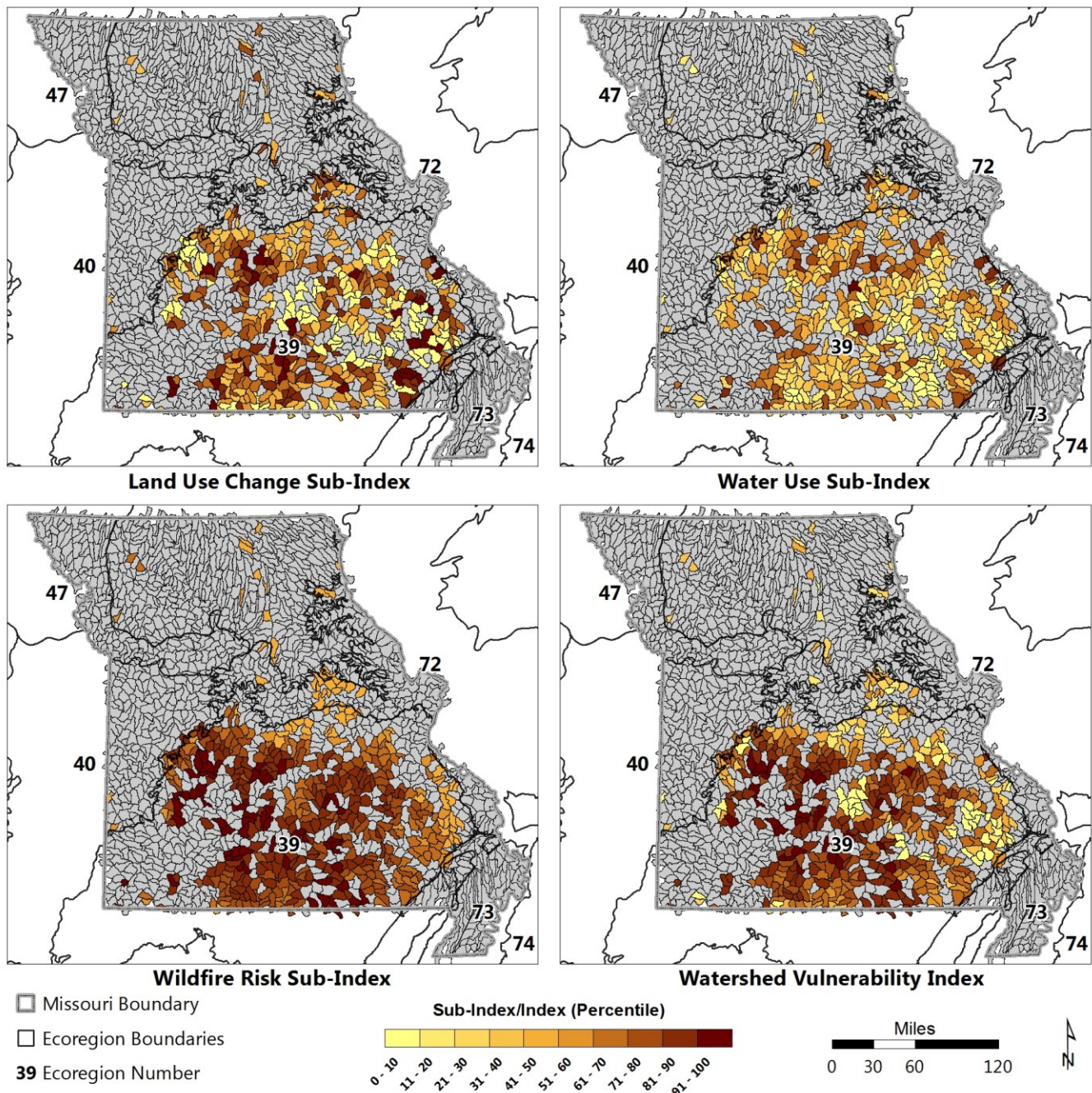
Map 4: HUC12s with statewide Watershed Health Index scores in the top quartile. The legend's five color breaks represent equal percentile intervals (5%) from the 75th to 100th percentile, relative to all HUC12s statewide. The top quartile was selected to generally focus on a subset of relatively healthier watersheds and does not necessarily denote a healthy or unhealthy threshold.



Map 5: Instate HUC12s with ecoregional Watershed Health Index scores that are in the top quartile of all HUC12s in their respective multi-state ecoregion. Ecoregional scoring, in which each HUC12 is scored relative to all HUC12s throughout its majority ecoregion, provides an alternative ranking of relative watershed health to statewide scoring. HUC12s with high ecoregional scores do not necessarily occur in-state due to the multi-state coverage of most ecoregions. The legend's five color breaks represent equal percentile intervals (5%) from the 75th to 100th percentile. The top quartile was selected to generally focus on a subset of relatively healthier watersheds and does not necessarily denote a healthy or unhealthy threshold.



Map 6: HUC12s that scored in the top 10% or top 25% for both statewide and ecoregional Watershed Health Index. Selecting a top-ranking subset of HUC12s based on both scores is a strategic way to focus on relative watershed condition across multi-state ecoregions as well as across the state.



Map 7: Statewide Watershed Vulnerability Index and Sub-Index scores of HUC12s in the top quartile for statewide Watershed Health Index. Maps include Land Use Change Sub-Index (upper left), Water Use Sub-Index (upper right), Wildfire Risk Sub-Index (lower left) and overall statewide Vulnerability Index (lower right). Vulnerability scores provide insights into some of the risks that may affect watershed health. More vulnerability factors likely exist but did not have suitable data available. Looking at vulnerability differences among the healthier watersheds statewide can help PHWA users consider relative urgency for management efforts.