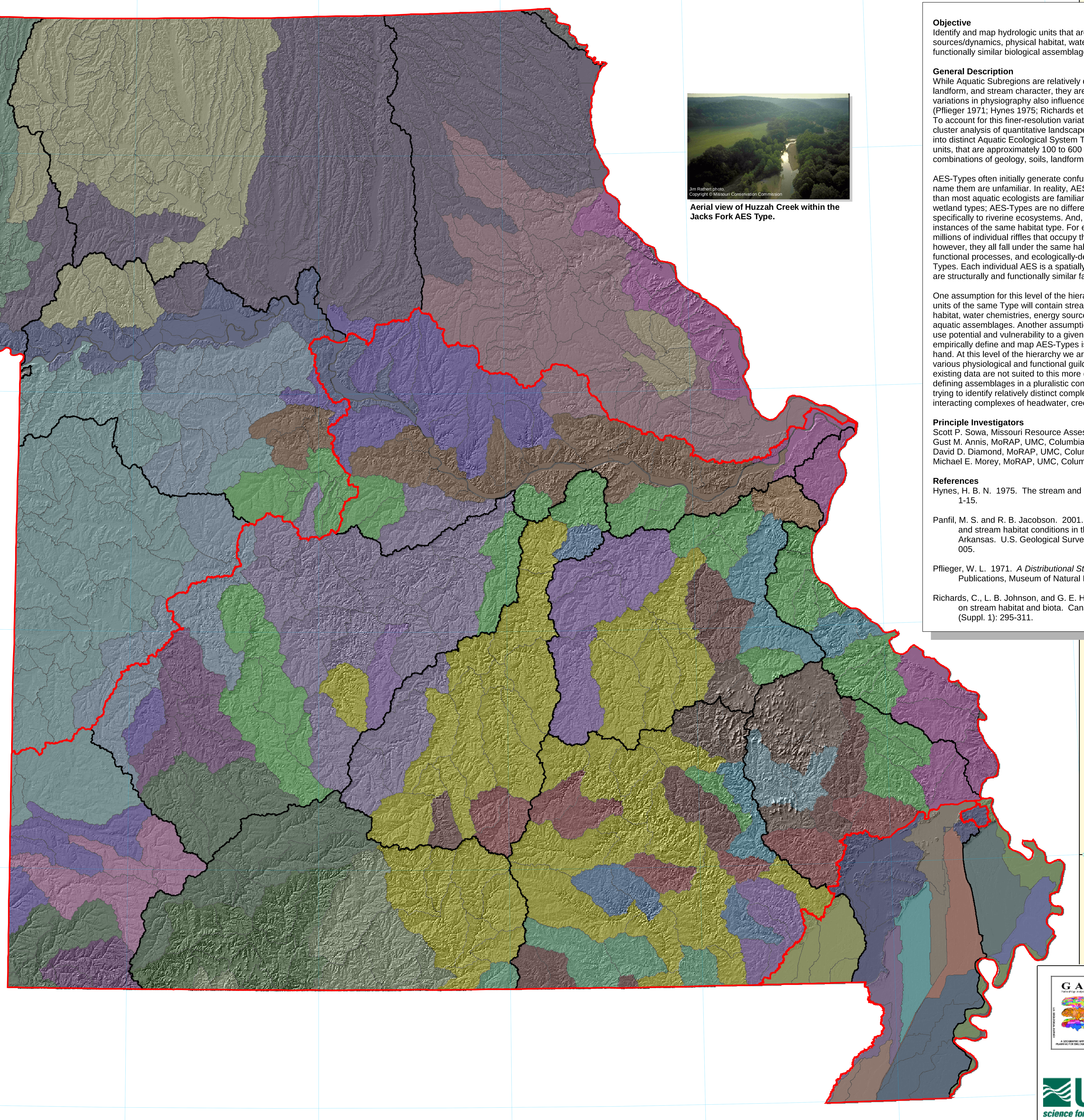
Aquatic Ecological Systems and Types

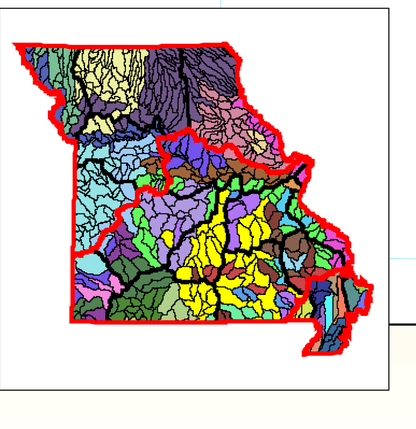


Legend

- Beaver Creek
- Big Creek of the St. Francis
- Boeuf Creek
- Bull Creek
- Cane Creek
- City of Chaffee
- City of Charleston
- City of Gideon
- City of Hayti
- City of Senath
- Clear Creek
- Crowley's Ridge
- Dry Fork of the Meramec
- East Locust Creek
- Finley Creek
- Honey Creek
- Indian Creek
- Jacks Fork
- Lick Creek
- Little River
- Little St. Francis River
- Lower Meramec
- Middle River
- Middle Upper Big River
- Middle Upper Little Sac
- Moniteau Creek
- Ramsey Creek
- Rock Creek
- Sampson Creek
- South Deepwater Creek
- Spring Creek of the Eleven Point
- Spring River of the Eleven Point
- St. Johns Diversion Ditch
- Tavern Creek
- Upper Big Piney
- Upper Cuivre River
- Upper Spring River of the Neosho
- West Ditch
- Wilkerson Ditch
- Aquatic Subregion Boundary
- Ecological Drainage Unit Boundary

Aerial view of Moss Creek within the Rock Creek AES Type.

Aerial view of Huzzah Creek within the Jacks Fork AES Type.



Objective
Identify and map hydrologic units that are relatively similar with regard to nutrient and energy sources/dynamics, physical habitat, water chemistry, hydrologic regimes, and also contain functionally similar biological assemblages.

General Description
While Aquatic Subregions are relatively distinct in terms of their climatic, geologic, soil, landform, and stream character, they are by no means homogeneous. These finer-resolution variations in physiography also influence the ecological composition of local assemblages (Pflieger 1971; Hynes 1975; Richards et al. 1996; Panfil and Jacobson 2001; Wang et al. 2003). To account for this finer-resolution variation in ecological composition we used multivariate cluster analysis of quantitative landscape data to group small- and large-river hydrologic units into distinct Aquatic Ecological System Types (AES-Types). AES-Types represent hydrologic units, that are approximately 100 to 600 mi^2, with relatively distinct (local and overall watershed) combinations of geology, soils, landform, and groundwater influence.

AES-Types often initially generate confusion simply because the words or acronym used to name them are unfamiliar. In reality, AES-Types are just “habitat types” at a much broader scale than most aquatic ecologists are familiar with. We have no problem recognizing lake types or wetland types; AES-Types are no different except that within our classification they apply specifically to riverine ecosystems. And, just like any habitat classification, there can be multiple instances of the same habitat type. For example, a riffle is a habitat type, yet there are literally millions of individual riffles that occupy the landscape. Each riffle is a spatially distinct habitat; however, they all fall under the same habitat type with relatively similar structural features, functional processes, and ecologically-defined assemblages. The same holds true for AES-Types. Each individual AES is a spatially distinct macrohabitat, however, all individual AESs that are structurally and functionally similar fall under the same AES-Type.

One assumption for this level of the hierarchy is that under natural conditions individual AES units of the same Type will contain streams having relatively similar hydrologic regimes, physical habitat, water chemistries, energy sources, energy and sediment budgets, and ultimately aquatic assemblages. Another assumption is that each AES-Type has a relatively distinct land use potential and vulnerability to a given land use. The reason biological data were not used to empirically define and map AES-Types is that the available data was not suited to the task at hand. At this level of the hierarchy we are interested in differences in the relative abundance of various physiological and functional guilds, not the mere presence or absence of species and existing data are not suited to this more detailed quantification. We are also interested in defining assemblages in a pluralistic context at this level of the hierarchy. Specifically, we are trying to identify relatively distinct complexes of multiple local assemblages (e.g., distinct interacting complexes of headwater, creek, small, and/or large river assemblages).

Principle Investigators
Scott P. Sowa, Missouri Resource Assessment Partnership (MoRAP), UMC, Columbia, Missouri
Gust M. Annis, MoRAP, UMC, Columbia, Missouri
David D. Diamond, MoRAP, UMC, Columbia, Missouri
Michael E. Morey, MoRAP, UMC, Columbia, Missouri

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Miles: 0, 20, 40, 80, 120, 160

Annis G. M., S. P. Sowa, M. E. Morey, and D. D. Diamond. 2005. Aquatic Ecological Systems and Types. MoRAP Map Series MS-2005-007.

Cartographer: Gust M. Annis

Missouri Resource Assessment Partnership (MoRAP), University of Missouri, 4200 New Haven Road, Columbia, MO 65201