

## River Corridor Hydrobiogeochemistry Across Basins

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**Project:** PNNL SBR SFA

**Project Website:** <https://sbrsfa.pnnl.gov/>

*This element of the PNNL SFA seeks to combine existing global datasets with WHONDRS-based data generation and numerical modeling distributed across the CONUS to discover transferable principles that integrate dissolved organic matter (DOM) chemistry, microbial gene expression, and biogeochemical function in natural and disturbed environments. This campaign leverages community-based approaches to extend our core research objectives across the CONUS. In addition to evaluating transferability of Columbia River Basin knowledge to other basins, the campaign will further establish SBR as a global leader in open watershed science, including a new cross-SBR-SFA initiative to facilitate transferrable knowledge among SBR test beds.*

There are five WHONDRS-based research activities in this campaign that all extend PNNL SFA efforts into multiple basins across the CONUS or to the global-scale. The first activity will analyze and model relationships among DOM chemistry, microbial gene expression, and aerobic respiration rates using data generated via previous globally distributed WHONDRS sampling campaigns. The second will use global data from previous and ongoing WHONDRS campaigns to study DOM chemistry to reveal globally consistent and context-dependent (and disturbance- impacted) chemical properties. The third activity will evaluate the degree to which NEXSS predictions of gradients in sediment respiration across stream orders hold across multiple CONUS basins. The fourth activity will pursue a multi-scale analysis (spanning within-reach, within-basin, and among-basin scales) to reveal how variation in DOM chemistry and microbial gene expression change across scales. In addition, these analyses will include a temporal component to characterize among-season changes in levels of variation across scales. The fifth activity will apply a basin-scale river corridor modeling framework--developed in the SFA's 'cumulative impacts' campaign--to multiple basins across CONUS. Applying the basin-scale modeling framework that integrates DOM chemistry, microbial gene expression, and wildfire impacts across CONUS basins will provide key information on how the framework needs to be modified so it can be easily used across basins. This is a key step towards using a basin-scale framework to inform (or potentially integrate with) CONUS-scale (e.g., the national water model) and global-scale (e.g., the land component of E3SM) models.