HINKSON CREEK WATERSHED WATER QUALITY ASSESSMENT

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1. RATIONALE

Hinkson Creek watershed is a multi-land-use watershed located in Boone County, Missouri that runs through the city of Columbia and MU property. Hinkson Creek has failed to meet water quality standards for aquatic life since 1998, and, despite several studies conducted in the past (Hooper, 2015; Hubbart, Hooper, Hosmer, & Hogan, 2014; Lea, 2013), the causes for the impairment are still unknown.

One of the hypotheses for the impairment is the **increased stormwater volume** resulting from urbanization and consequent increase in impervious surfaces which

a) increases channel erosion and sediment transport which adversely affect aquatic organisms, and
b) decreases stream water quality by allowing pollutants to arrive to the Creek faster, limiting the opportunities for transformation and retention.

Another hypothesis for Hinkson Creek impairment is contamination due to **road salt applications**.

Hinkson Creek water quality data is limited both regarding spatial and temporal coverage (although see Kellner & Hubbart, 2018; Zeiger & Hubbart, 2017, 2018). To build upon previous efforts, Argerich and collaborators, have designed and implemented a monitoring plan with **broad spatial coverage and spanning different hydrologic conditions to capture pollutant hotspots and hot moments at the Hinkson main stem and tributaries**. We hypothesize that multiple stressors impact the Hinkson and that the relative importance of these stressors will vary spatially, in response to land use and geomorphology, and temporally, in response to precipitation and temperature.

2. SAMPLING SCHEME

- The sampling lasts two hours and occurs four times per year.
- We sample a minimum of 30 sites at the main stem and 10 sites at the tributaries (Fig 1).
- Water samples are analyzed for chloride, specific conductivity, total nitrogen, nitrate, ammonium, total phosphorus, soluble reactive phosphorus, and dissolved organic carbon. We would like to incorporate the analysis of suspended sediments to inform about erosion processes.

3. PREVIOUS RESULTS

We have sampled on five occasions. Results show a decrease in phosphorus and nitrogen concentrations and increasing chloride concentrations as we move downstream, except for June 2019 when total phosphorus remained high throughout the stream. Highest and lowest chloride concentrations have been seen on June 2018 and June 2019, respectively, under contrasting flow conditions (0.3 cfs vs. 214 cfs). Current funding will cover another sampling event which is scheduled for mid—October.

Since our results indicate a strong dependence of water quality on hydrological conditions, **we propose to extend the monitoring another year**, to be able to capture water quality changes across a broader range of streamflow.

4. COST

Cost of the analyses of 160 samples for:	Price
Total nutrient (Total Phosphorus, Total Nitrogen)	$5,807
Readily bioavailable nutrients (Soluble Reactive Phosphorus, Nitrate, Ammonium)	$6,783
Specific conductivity and chloride	$3,400
Total Direct Costs	$15,903

The cost of adding total suspended sediments analyses is $3,730.

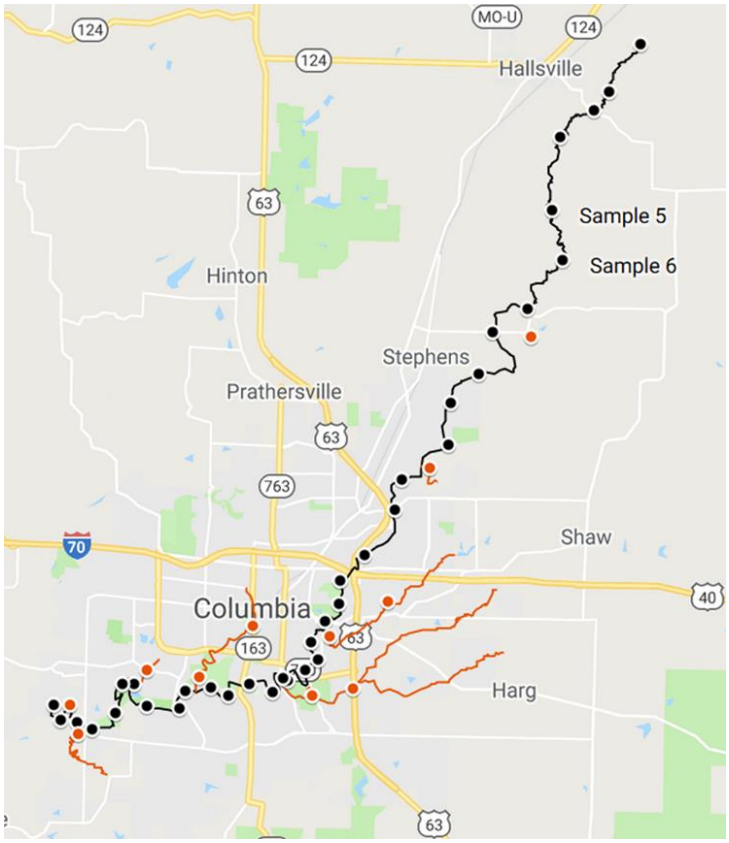

Fig. 1 Sampling sites

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