

Supplemental Data

SUPPLEMENTAL TABLE 1. Description of physical and chemical attributes measured from sampled water, and meteorological, hydrological, temporal, and land use variables. These variables were used as independent criteria in classification and regression tree analyses.

Variable Name	Variable Description (unit)
SEASON	The season (spring, summer, fall or winter) in which the sample was collected
SHREVE*	The size of the sampled watercourse at the sample site following Shreve (1966)
STRAHLER**	The size of the sampled watercourse at the sample site following Strahler (1952)
AMIA_AMN	NH ₃ (ammonia) + NH ₄ (ammonium) concentration in sample water (mg L ⁻¹)
NITRITE	NO ₂ ⁻ (nitrite) concn in sample water (mg L ⁻¹)
NITRATE	NO ₃ ⁻ (nitrate) concn in sample water (mg L ⁻¹)
REA_PHOS	Dissolved reactive phosphorus concn in sample water (mg L ⁻¹)
TOTKN	Total Kjeldahl nitrogen (TKN) concn in sample water (mg L ⁻¹)
TOTPHO	Total phosphorus concn in sample water (mg L ⁻¹)
TEMP	Temperature of sample water (°C)
pH	pH of sample water
CONDUCTIVITY	Electrical conductivity of sample water (mS cm ⁻¹)
DISS_ OXYGEN _P,	Gaseous O ₂ dissolved in sample water (% saturation and mg L ⁻¹)
DISS_ OXYGEN	
_MGL	
ORP	Oxidation reduction potential of sample water (mV)
TURBIDITY	Cloudiness of sample water as measured with a nephelometer sensor (NTU; nephelometric turbidity units)
DIS_PAY	Mean daily river discharge at Payne (Shreve order = 3243) hydrometric station (m ³ s ⁻¹)
RUS_TOTALRAIN,	Total Russell meteorology (met.) rainfall for day of sampling; total Russell met. rainfall for day of sampling and x = 1, 2, 3 and 7 days in advance of sampling day (mm)
RUS_TOTALRAINxD	
RUS_MAXTEMP,	Daily maximum, minimum and mean air temperature at Russell met. station (°C)
RUS_MINTEMP,	
RUS_MEANTEMP	
BASIN_(land use)	Proportion of land use (determined via RS) in total sample site catchment area: Cropland, developed, forage, pasture, shrubland, and forest (km ² km ⁻²)
CROPP_yK	Proportion of cropland, identified via RS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km (km ² km ⁻²)
DEVELP_yK	Proportion of developed land, identified via RS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km (km ² km ⁻²)
FORAGEP_yK	Proportion of forage land, identified via RS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km (km ² km ⁻²)

PASTP_yK	Proportion of pasture land, identified via RS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km ($\text{km}^2 \text{km}^{-2}$)
SHRUBP_yK	Proportion of shrubland, identified via RS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km ($\text{km}^2 \text{km}^{-2}$)
VEGP_yK	Proportion of forest, identified via RS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km ($\text{km}^2 \text{km}^{-2}$)
NUD_(land use)	Upstream distance from sample location to nearest land use observations identified by R-SS of type barn (BARN), developed high (DEVHI), developed low (DEVLO), forest (FOREST), pasture (PASTURE), dairy operation (DAIRY_OP), cattle or dairy barn (CAT_DAI_BA), pasture with no restriction to water course (PAST_ACC), horse barn (HORSEBA), hog barn (HOGBA) and poultry barn (POULBA) (km)
DBARN_yK	Density of barns, identified via R-SS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km (obs. km^{-2})
DDEVHI_yK	Density of developed high, identified via R-SS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km (obs. km^{-2})
DDEVLO_yK	Density of developed low, identified via R-SS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km (obs. km^{-2})
DFORE_yK	Density of forest, identified via R-SS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km (obs. km^{-2})
DPAST_yK	Density of pasture, identified via R-SS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km (obs. km^{-2})
DDAIRYOP_yK	Density of dairy operations, identified via R-SS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km (obs. km^{-2})
DCAT_OR_DA_yK	Density of cattle or dairy operations, identified via R-SS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km (obs. km^{-2})
DPAST_ACC_yK	Density of pasture with no watercourse restrictions, identified via R-SS, in catchment areas upstream of site with MUFL of 2, 5, and 10 km (obs. km^{-2})

x = number of days in advance of sample; y = maximum upstream flow length (MUFL) from the

sample site at which sample site catchment was defined; K = km; obs., number of observations; RS (remote sensing); R-SS (road-side survey).

* **Shreve R. L. 1966.** Statistical law of stream numbers. *J. Geol.* **74**:17–37.

****Strahler A.N. 1952.** Dynamic basis of geomorphology. *Geol. Soc. Am. Bull.* **63**:923–938.