



Evaluation of Water Quality and Best Management Practices (BMPs) in the Black Creek Watershed Using the SWAT Model



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Black Creek Watershed (BCW)

- Location: Shelby County in Northeast Missouri
- Area: 140 km²
- Source of pollutants: Nonpoint sources of runoff from agricultural lands

Goals

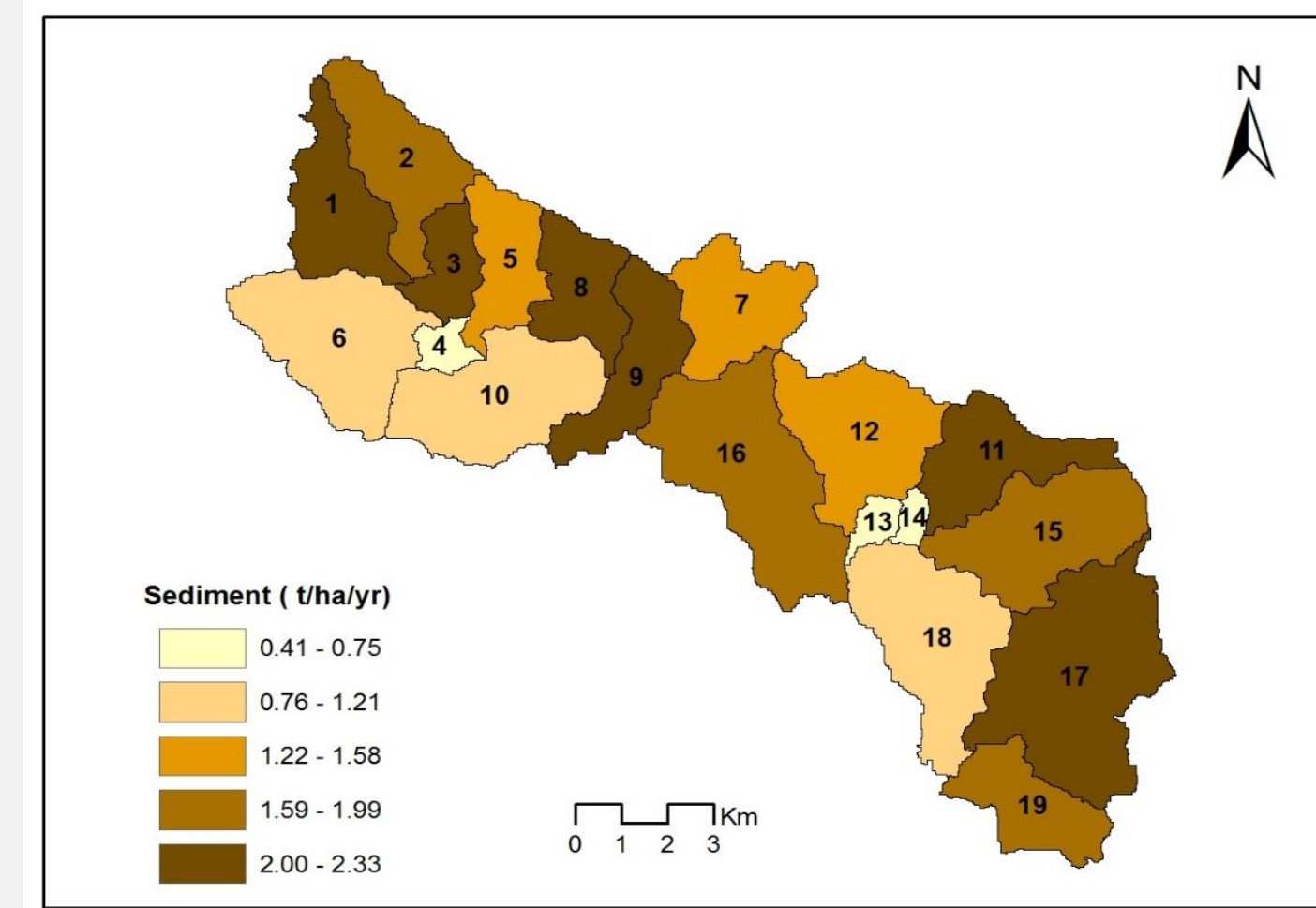
- Quantify sediment and nutrient (nitrogen and phosphorus) losses
- Identify and prioritize critical sub-watersheds for land management
- Evaluate the effectiveness of alternative BMPs for reducing pollutant loads

SWAT Model Calibration (2005-2008) and Validation (2009-2010) (Observed data recorded by ARS and USGS)

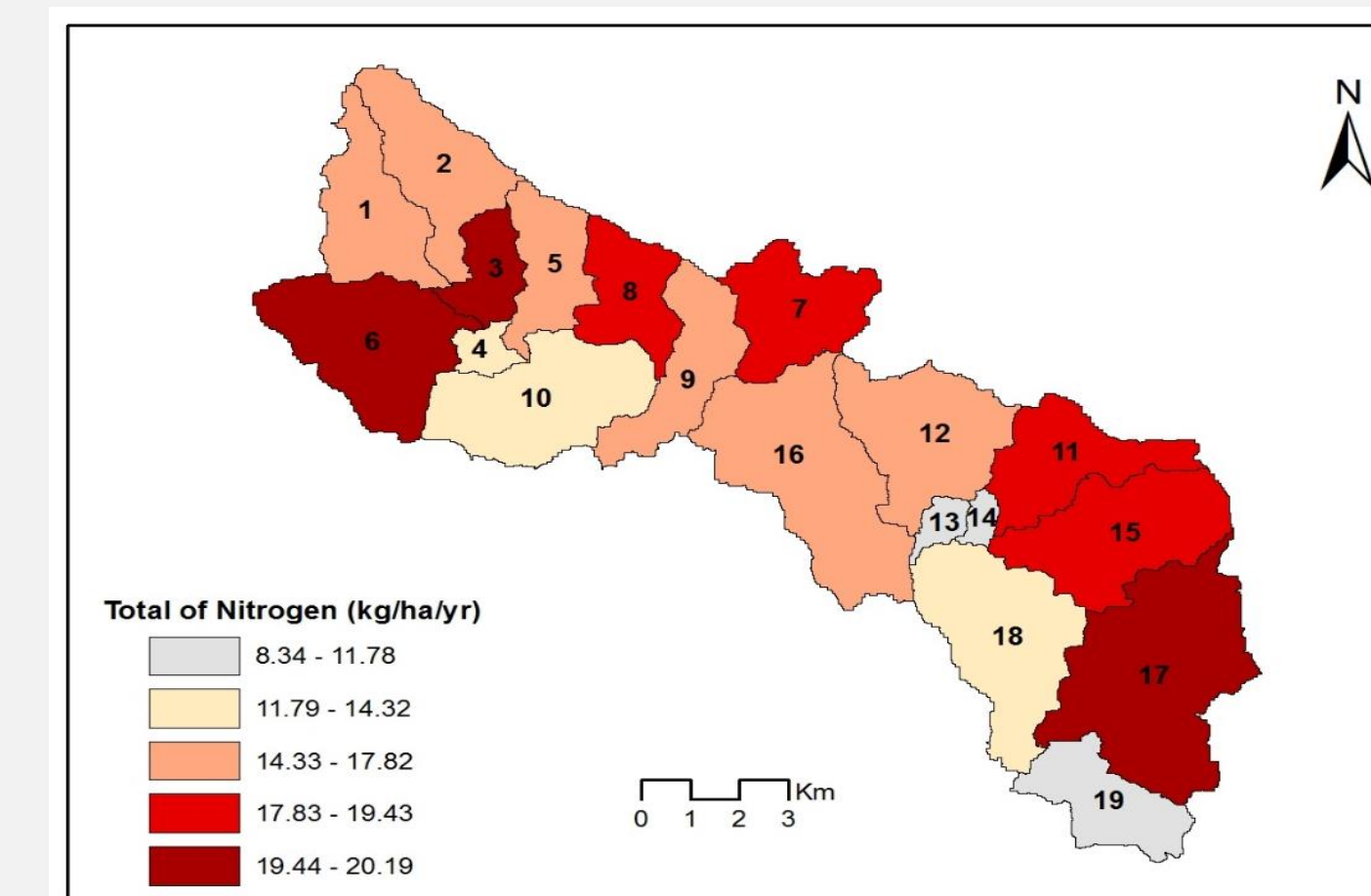


Baseline Results

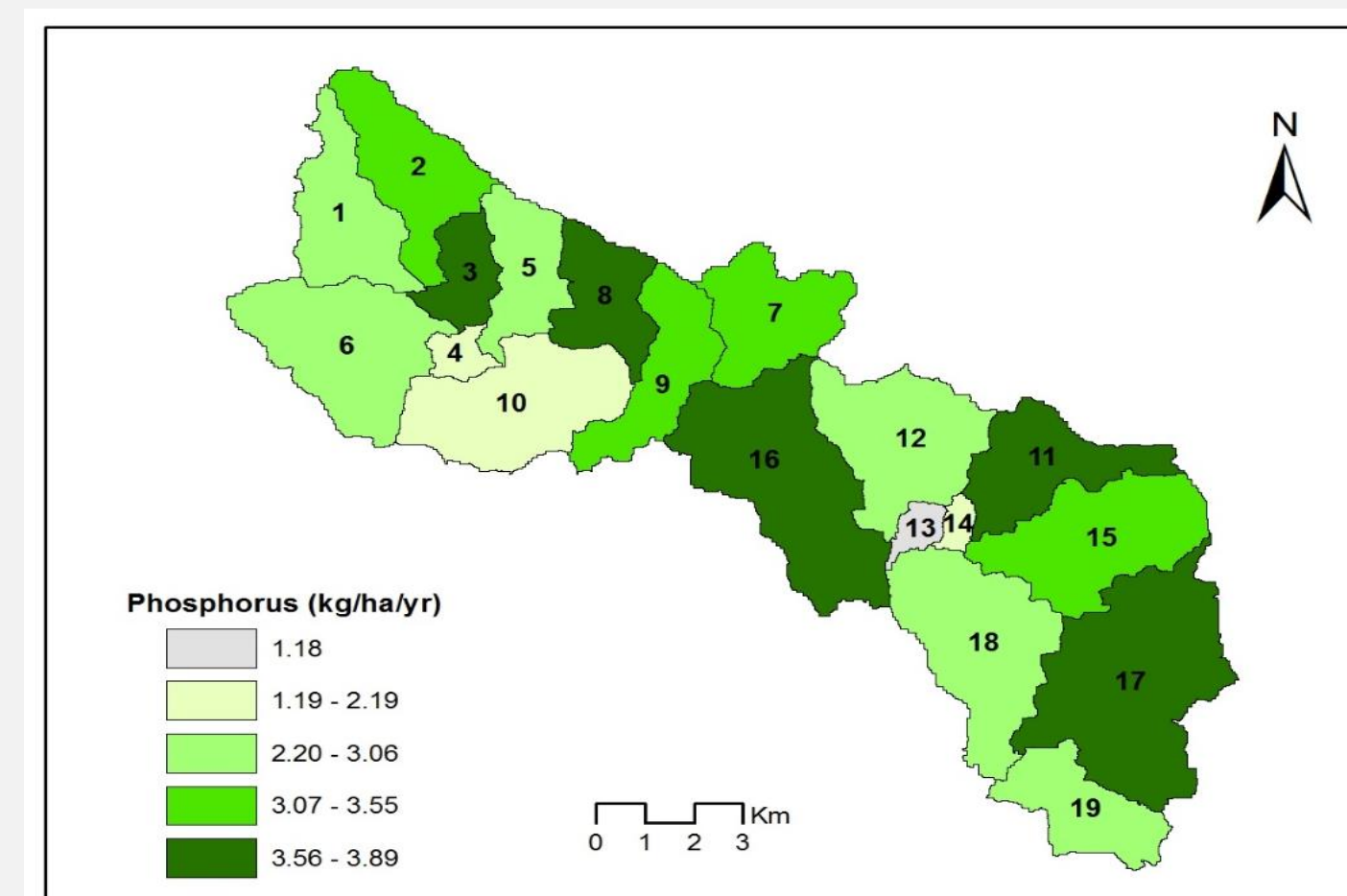
Quantify sediment, nitrogen and phosphorus losses



Sediment loading (ton/ha/yr) per subwatershed

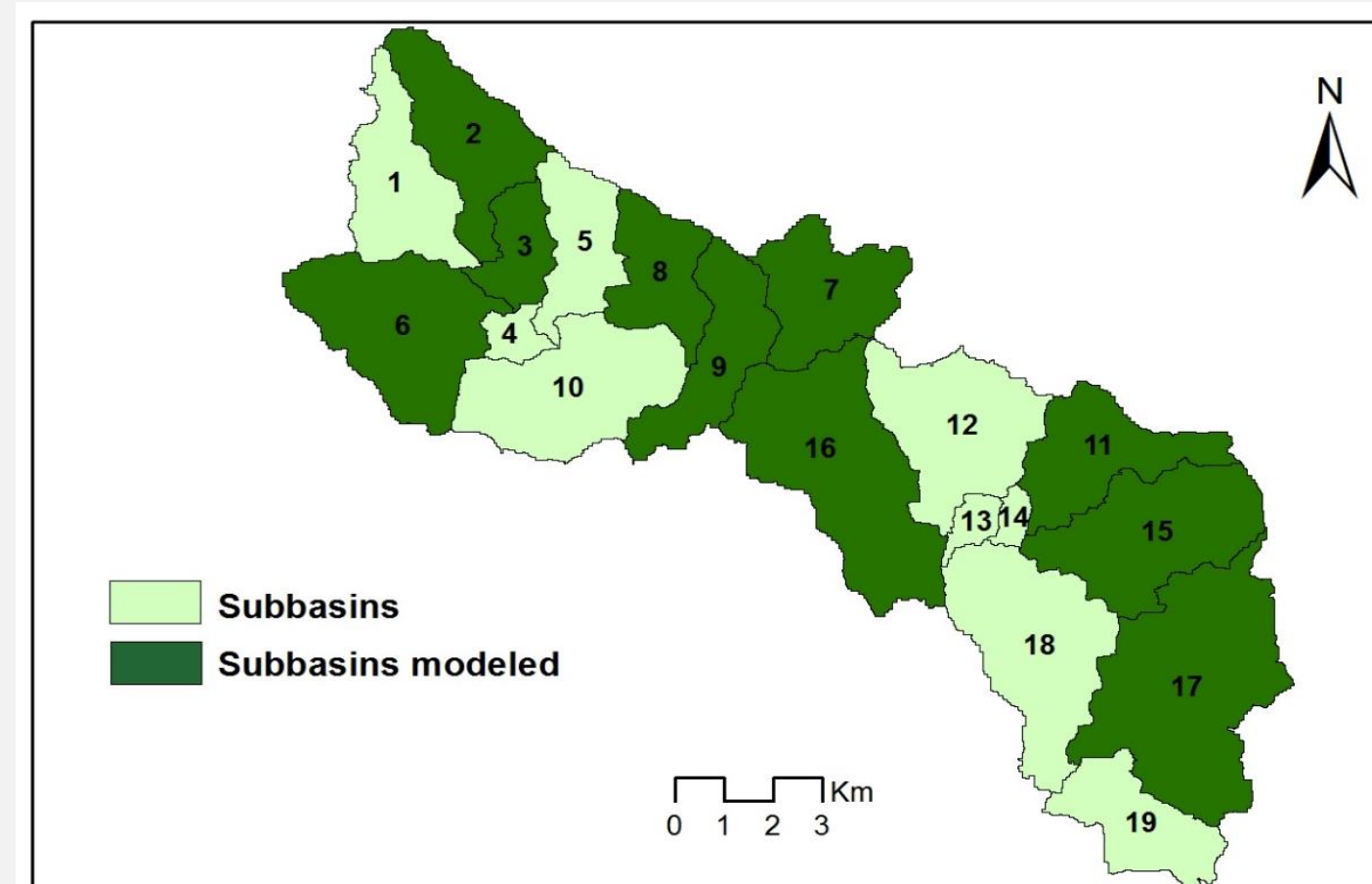


Total nitrogen loading (kg/ha/yr) per subwatershed



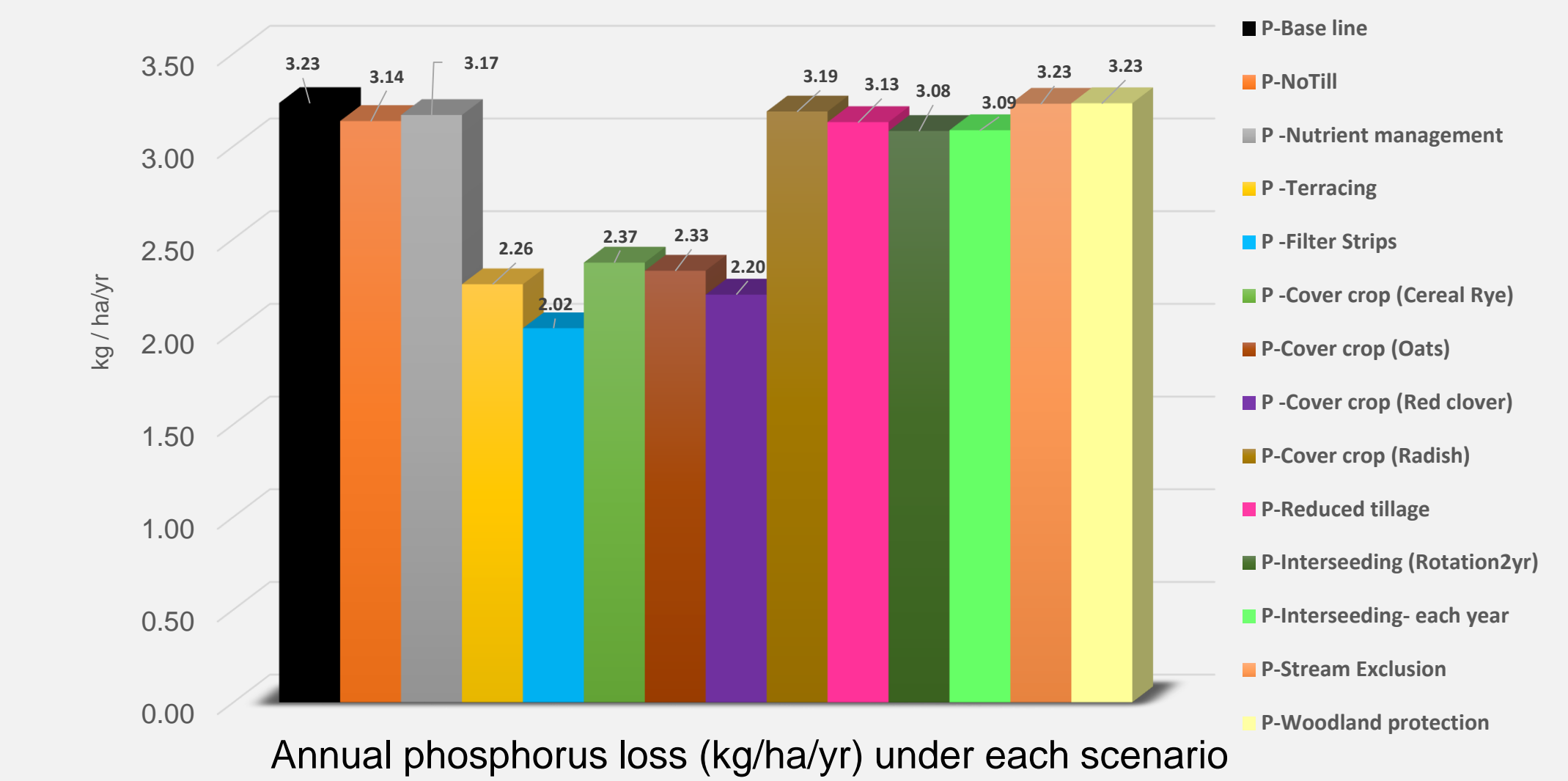
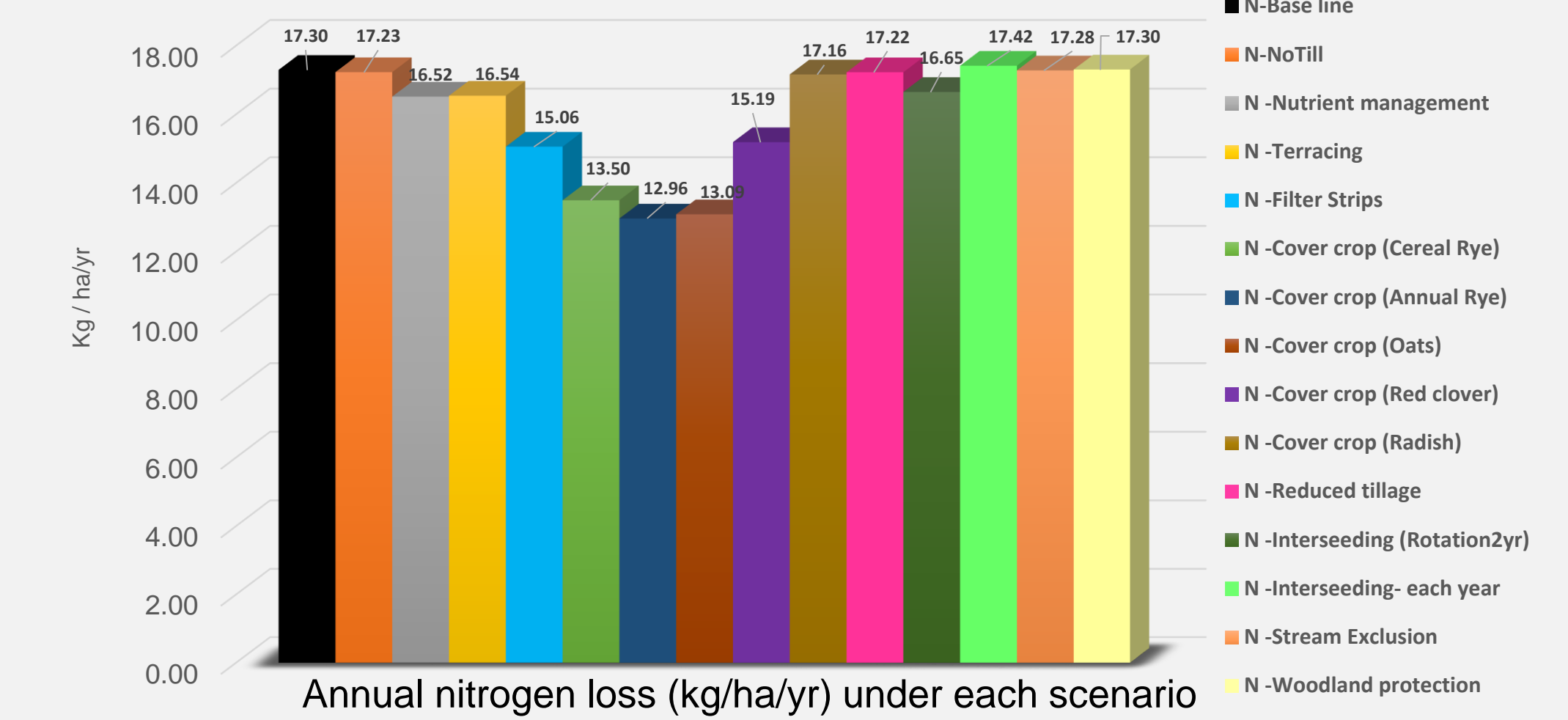
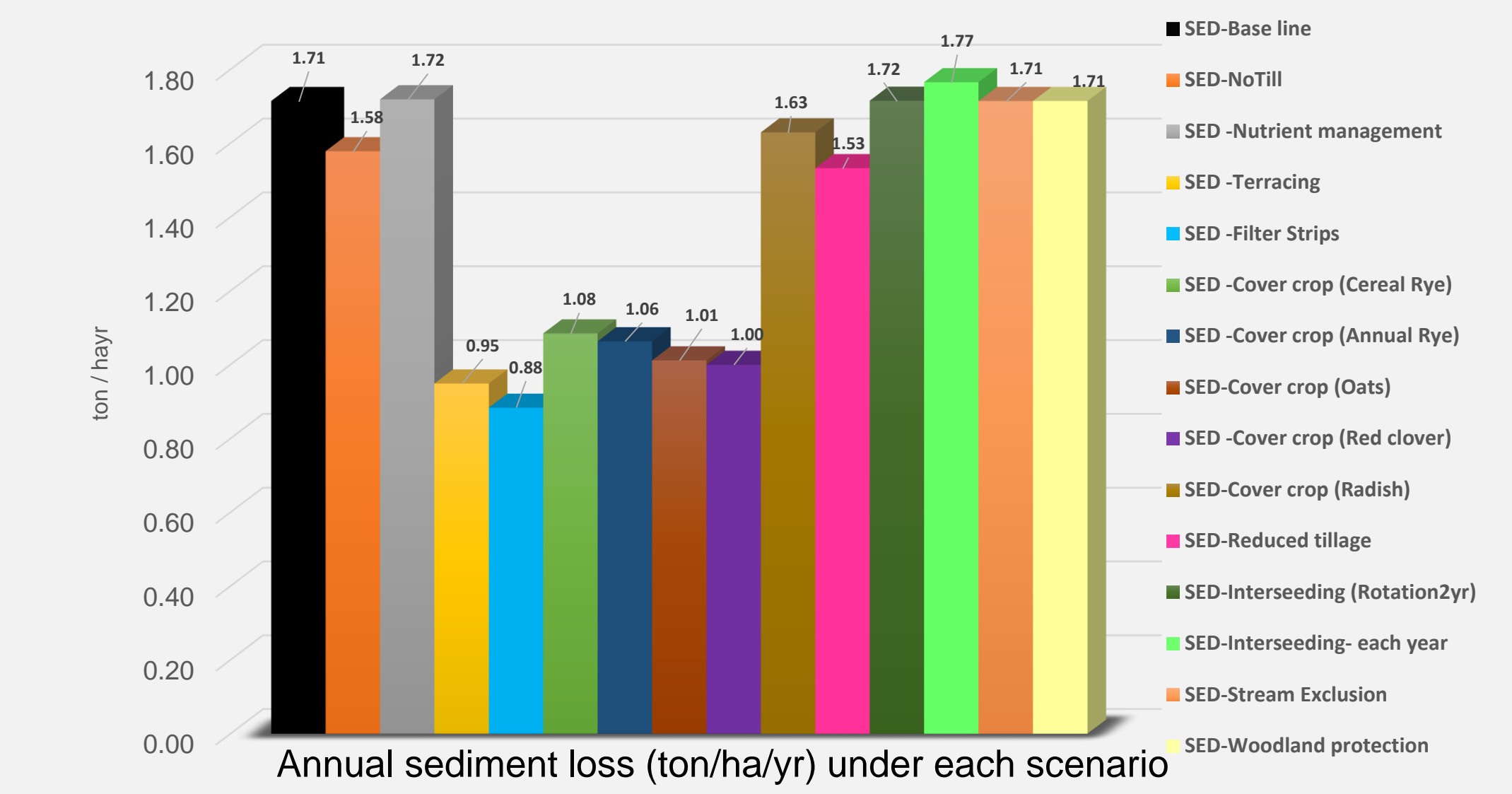
Total phosphorus loading (kg/ha/yr) per subwatershed

Identify critical sub-watersheds for land management



Subwatersheds with the highest baseline loading modeled in BMPs

Evaluate the effectiveness of alternative BMPs



Load reduction (%) at the outlet of the BCW under BMPs

BMPs	Nitrogen	Phosphorus	Sediment
No Till	-0.39	-3.01	-7.93
Nutrient Management	-4.51	-2.00	0.26
Terracing	-4.37	-30.25	-44.64
Filter Strips	-12.94	-37.58	-48.47
Cover Crop (Cereal rye)	-21.98	-26.63	-36.74
Cover Crop (Annual rye)	-25.05	-27.14	-37.97
Cover Crop (Oats)	-24.34	-27.99	-40.99
Cover Crop (Red clover)	-12.19	-31.97	-41.69
Cover Crop (Radish)	-0.78	-1.42	-4.95
Reduced Tillage	-0.41	-3.19	-10.60
Inter-seeding (Rotation 2yr)	-3.72	-4.66	0.05
Inter-seeding (Each year)	0.69	-4.54	2.97
Stream Exclusion	-0.09	-0.13	0.00
Woodlands protection	0.05	-0.04	-0.01