5.0 Current Loads of Pollutants

A good mechanism for determining sources of nonpoint pollution is hydrologic simulation models. Hydrologic models detail the transport of pollutants across the land surface as components of surface water run-off. Rainwater flowing over the land and ground water flowing through the soil can take up pollutants including E.coli, sediments and nutrients. Soil characteristics and land uses influence the way that water moves through the system and each hydrologic model simulates the movement in a different way. They serve as a check on the critical area determinations made using water chemistry sample and GIS-based watershed data. Watershed loading rates can be estimated using a variety of loading models for a variety of parameters. The parameters chosen are those that are potential causes and exceeding current water quality targets. Estimates of current loading were calculated from using water quality data collected from 2011-2012. Each HUC 10 subwatershed had a minimum of 1 to several water sampling sites.

Table 66 Sampling Locations Used for Load Estimations

HUC 10 Subwatershed	Number of Sampling Sites	Sampling Location ID
Oliver Ditch	1	J15
Carpenter-Denton Creeks	4	J22, J34, J33
Upper Iroquois-Ryan Creek	6	J28, J1, J2, J4, J30
Curtis-Hunter Creek	6	NH, J26, J37, NF, NE, ND
Montgomery-Strole Creek	3	NB, NA,NC

Current loading estimates were calculated by Purdue's Online Load Duration Curve Tool in conjunction with IDEM recommendations (Fisher per comm.). Estimates were obtained by multiplying the average pollutant concentration from sampling points in that subwatershed, an estimate of the volume of stream flow passing through that location at a certain point based on actual stream flow or the nearest USGS gage, and a specific conversion factor to transform each concentration measurement into a mass-based or organism-based "load" for that point in time. Our estimates for mass-based pollutants (nutrients and sediment) are expressed in tons per year (T/Yr). Since E. coli does not have a specific mass-based conversion factor, the total number of organisms was calculated to give load in billions of organisms per year (G-org/Yr). Current loads for each subwatershed and required reductions to meet water quality targets are shown in
Table 67 Loads and Load Reductions.

Table 67 Loads and Load Reductions

HUC 10	Oliver Ditch	Carpenter-Denton Creeks	Upper Iroquois-Ryan Creek	Curtis-Hunter Creek	Montgomery-Strole Creek	HUC 8 watershed Overall Tota
Sq.Miles	82	145	136	162	127	651
Annual Nitrate Load (Tons/Yr)	0.16	0.29	0.97	0.312	0.35	2.08
Annual Target Load	0.07	0.09	0.31	0.122	0.09	0.69
Reduction Needed	0.09	0.20	0.66	0.190	0.26	1.40
% Reduction Needed to reach WQ Target (1.5ppm)	55%	68%	68%	61%	74%	67
Annual orthophosphorus Load (#/Yr)	0.83	48.73	132.99	102.09	92.16	376.79
Annual Target Load	0.07	1.25	4.12	1.08	1.19	7.71
Reduction Needed	0.76	47.48	128.87	101.00	90.96	369.08
% Reduction Needed to reach WQ Target (.005ppm)	91%	97%	97%	99%	99%	98
Annual Sediment Load (Tons/Yr)	1778	15036.78	11555.37	4974.29	4584.30	37,929.08
Annual Target Load	992	1422.72	4282.52	1697.50	1238.31	9,632.60
Reduction Needed	787	13614.06	7272.85	3276.79	3345.99	28,296.48
% Reduction Needed to reach WQ Target (10.4)	44%	91%	63%	66%	73%	75
Annual ecoli Load (B-org/Yr)	63	175.25	420.12	175.84	231.54	1,066.12
Annual Target Load	102	133.11	438.73	173.90	126.86	974.19
Reduction Needed	0	42.14	0	1.94	104.68	148.75
% Reduction Needed to reach WQ Target (235 MPN)	0%	24%	0%	1%	45%	14

Note, current loadings are estimated for a single point in time and may not reflect the variation in actual, real world pollutant loading that occurs within each watershed over the course of the year. We introduce some of these other variables (land use, land cover, etc) in the final critical and priority areas ranks. Downstream watersheds often take on water quality impairments from upstream drainages, so, if we were to focus all our efforts on the drainages where loading is documented, we still might not be addressing the true source of the loading. This is why loading calculations are only one tool in the watershed tool box to help us address nonpoint pollutants.

For example, the 2008 TMDL for E.coli % reduction is 75% watershed wide, and Table 68 compares the UIWI WQ data from 2011-2012 that was used to come up with a watershed wide reduction of only 14% clearly reveals this variation. E.coli monitoring will continue to be conducted to further investigate this variation.

Table 68 E.coli % Reduction UIWI Data vs. TMDL

HUC 10 E.coli % Reduction Needed to reach WQ Target (235 MPN)	Oliver Ditch	Carpenter-Denton Creeks	Upper Iroquois-Ryan Creek	Curtis-Hunter Creek	Montgomery-Strole Creek	HUC 8 watershed Overall Totals
UIWI WQ Data 2011-2012	0%	24%	0%	1%	45%	14%
2008 TMDL %E.coli Reductions Report	69%	74%	72%	81%	67%	73%