

1 TMDL: Olentangy River Watershed, Ohio

Date:

DECISION DOCUMENT OLENTANGY RIVER WATERSHED TMDL

Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 C.F.R. Part 130 describe the statutory and regulatory requirements for approvable TMDLs. Additional information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations, and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation. Use of the term "should" below denotes information that is generally necessary for EPA to determine if a submitted TMDL is approvable. These TMDL review guidelines are not themselves regulations. They are an attempt to summarize and provide guidance regarding currently effective statutory and regulatory requirements relating to TMDLs. Any differences between these guidelines and EPA's TMDL regulations should be resolved in favor of the regulations themselves.

1. Identification of Waterbody, Pollutant of Concern, Pollutant Sources, and Priority Ranking

The TMDL submittal should identify the waterbody as it appears on the State's/Tribe's 303(d) list. The waterbody should be identified/georeferenced using the National Hydrography Dataset (NHD), and the TMDL should clearly identify the pollutant for which the TMDL is being established. In addition, the TMDL should identify the priority ranking of the waterbody and specify the link between the pollutant of concern and the water quality standard (see section 2 below).

The TMDL submittal should include an identification of the point and nonpoint sources of the pollutant of concern, including location of the source(s) and the quantity of the loading, e.g., lbs/per day. The TMDL should provide the identification numbers of the NPDES permits within the waterbody. Where it is possible to separate natural background from nonpoint sources, the TMDL should include a description of the natural background. This information is necessary for EPA's review of the load and wasteload allocations, which are required by regulation.

The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as:

- (1) the spatial extent of the watershed in which the impaired waterbody is located;
- (2) the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);
- (3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;
- (4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and
- (5) an explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment impairments; chlorophyll *a*, and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

Comments:

According to the Ohio Environmental Protection Agency (OEPA) 303(d) list for 2006, the major causes of impairment in the assessment units within the Olentangy River watershed are Fish Consumption Advisory (FCA) for PCBs, **n**utrients, pathogens, siltation, flow alteration, and habitat

alterations, and thermal modifications (see [Table 1](#) below). The submitted TMDLs address all of these impairments with the exception of the FCA for PCBs (See [Table 10](#) in the conclusion section of this decision document).

Table 1

	Assessment Unit (AU) Name	Size (Mi²)	303 (d) Listed Impairments	Priority Ranking
	Olentangy River (headwaters to downstream Flat Run)	133.6	Nutrients, Siltation, Habitat Alterations, Flow Alteration, FCA-PCBs	7
	Whetstone Creek	114.5	Nutrients, Thermal Modifications, Siltation, Habitat Alterations, Flow Alteration, FCA-PCBs	9
	Olentangy River (downstream Flat Run to downstream Delaware Run); excluding Whetstone Creek	183.0	Siltation, Habitat Alterations, Nutrients, Flow Alteration, FCA-PCBs	8
	Olentangy River (downstream Delaware Run to mouth)	113.0	Siltation, Nutrients, Flow Alteration, FCA-PCBs	8

A point system is used in Ohio's 303(d) list to assign priority. This prioritization is based upon the use impaired (recreational, aquatic life, and fish consumption), and the severity of the impairment in each category. The total priority points assigned to an assessment unit (AU) are composed of the status of the recreation use (a maximum of 7 points), the status of the aquatic life use (a maximum of 4 points) and the status of the fish consumption use (maximum of 2 points). A total of 13 points could be assigned to an assessment unit. The assessment units addressed in the submitted TMDL are identified, according to the Ohio 303(d) list for 2006, with priority rankings of 7, 8 and 9 points (See [Table 1](#) above). Additionally, OEPA's TMDL development schedule corresponds with OEPA's basin-rotation water quality monitoring schedule in order to take advantage of all available resources for TMDL development. The basin-rotation schedule will be used unless there is a significant reason to deviate from it. Priority may be upgraded or downgraded depending on designated uses, magnitude of impairment, implementation practices by other interested parties, or availability of new guidance.

The assessment units, mention in the tables above, are located in the Olentangy River Watershed. The Olentangy River watershed is located in central Ohio in Crawford, Richland, Delaware, Franklin, Marion and Morrow. The watershed covers approximately an area of 542.3 Mi², and is divided into 4 separate 11-digit HUC major sub-watersheds (upper Olentangy, middle Olentangy, lower Olentangy, and Whetstone Creek) and 23 separate 14-digit HUC minor sub-watersheds (See [Figure 2.1](#) and [Table 2.1](#) of the final TMDL report). [Table 2](#) below indicates Olentangy River watershed major and minor sub-watershed breakdown.

Table 2

Major Sub-watershed	Upper Olentangy	HUC 05060001-090
	Minor Sub-watershed	HUC
	Olentangy R. headwaters to near New Winchester	05060001-090-010
	Olentangy R. near New Winchester to above Flat Run	05060001-090-020
	Mud Run	05060001-090-030
	Flat Run	05060001-090-040
Major Sub-watershed	Whetstone Creek	HUC 05060001-100
	Minor Sub-watershed	HUC
	Whetstone Cr. headwaters to above Shaw Cr.	05060001-100-010
	Shaw Creek	05060001-100-020
	Whetstone Cr. below Shaw Cr. to Olentangy R.	05060001-100-030
Major Sub-watershed	Middle Olentangy	HUC 05060001-110
	Minor Sub-watershed	HUC
	Olentangy R. below Flat Run to below GS ¹ at Claridon	05060001-110-010
	Olentangy R. below GS ¹ at Claridon to above Grave Cr.	05060001-110-020
	Riffle Creek	05060001-110-030
	Grave Creek	05060001-110-040
	Olentangy R. below Grave Cr. to above Whetstone Cr.	05060001-110-050

Table 2

Major Sub-watershed	Upper Olentangy	HUC 05060001-090
Major Sub-watershed	Middle Olentangy	HUC 05060001-110
	Minor Sub-watershed	HUC
	QuQua Creek	05060001-110-060
	Brondige Run	05060001-110-070
	Olentangy R. below Whetstone Cr. to Delaware Res. Dam	05060001-110-080
	Olentangy R. from Delaware Res. Dam to below Horseshoe Run	05060001-110-090
	Horseshoe Run	05060001-110-100
	Delaware Run	05060001-110-110
Major Sub-watershed	Lower Olentangy	HUC 05060001-120
	Minor Sub-watershed	HUC
	Olentangy R. below Horseshoe Run to below Delaware Run	05060001-120-010
	Olentangy R. near Powell	05060001-120-020
	Olentangy R. near Worthington	05060001-120-030
	Olentangy R. from near Worthington to GS ¹	05060001-120-040
	Olentangy R. from GS ² to Dodridge Street	05060001-120-050
	Olentangy R. from Dodridge Street to Scioto River	05060001-120-060

GS¹ = USGS Gage Station 03226800

GS² = USGS Gage Station 03226885

The Olentangy River watershed land use is dominated by agriculture (56% cropland, and 14% pasture/hay), forested land (14%), and urban land (14%) (See Plate A.5 in Appendix A and Section 2.3 of the final TMDL report).

Runoff from lands modified by development and land use related practices can harm surface water resources in several ways, including the changing of natural habitat and hydrologic patterns and elevating pollutant concentrations and loadings. Stormwater runoff may contain or mobilize high levels of contaminants, such as total suspended solids (TSS), nutrients (e.g. phosphorus), and pathogens. These contaminants can directly or indirectly be detrimental to the environment, and the aquatic life.

Changes to hydrology due to human intervention can alter the natural streamflow regime by increasing surface runoff and decreasing groundwater recharge. As watersheds become increasingly impervious due to roofs, roads, parking lots, lawns and agriculturally managed lands less water is able to infiltrate/percolate to the groundwater leading to reduced baseflows, and more precipitation runs off the land faster during storms leading to higher peak flows. Additional changes to the hydrologic cycle include interception, storage, and discharge of water for municipal and industrial uses. Direct alteration of the stream channel and riparian buffer zones by channelization, levees, changes to the bank materials, and removal of riparian vegetation also affect the streamflow regime. As channels are straightened and/or confined, the stream flow energy does not have an outlet with which to decrease its power. This propagates downstream increasing peak flows, channel down-cutting, flooding downstream, bank erosion, and channel destabilization. Alteration of the natural flow regime increases the amount of sediment and suspended solids likely to enter streams.

High concentrations of bedload sediments and suspended solids (TSS) clog fish gills, retard growth rates, decrease resistance to disease, and prevent egg and larval development. High concentrations of bedload sediments and suspended solids can also reduce the amount of sunlight available to aquatic organisms and decrease water clarity which in turns impairs the ability of fish to see and catch food, and increases stream temperature. Nutrients, pathogens, and other contaminants can attach to suspended or bedload sediments and become concentrated in the waterways. Nutrient enrichment can stimulate aquatic plants and algal growth to the point where they are a nuisance and detrimental to the environment. Such changes in the habitat affect the species composition away from functional assemblages comprised of intolerant species, benthic insectivores, and top carnivores typical of high quality streams towards less desirable assemblages

of tolerant species, niche generalists, omnivores, and detritivores typical of degraded streams. Such a shift in community structure lowers the diversity of the system.

Point source discharges from treatment water plants and storm water runoff sites alter the watershed characteristics. Wastewater discharges can contain a wide variety of pollutants. There are a total of 51 wastewater treatment plant (WWTP) facilities that hold individual NPDES permits in the Olentangy River watershed (See [Table B.2](#) and [Table B.3](#) in Appendix B, and [Table 8.2](#) of final TMDL report). There are also some municipalities that hold Municipal Separate Storm Sewer System (MS4s) Storm Water permits in the Olentangy River watershed.

Point sources such as combined sewer overflow (CSO) and sanitary sewer overflow (SSO) systems can also contribute to the watershed impairments. The impact of CSO and SSO on water quality is most apparent as high bacteria concentrations during high flow conditions. However, pollutants contributed to the stream by CSO and SSO can also affect water quality during average-to low-flow conditions. CSO and SSO contain organic solids that can settle to the stream bottom downstream of the overflow outfall. The resulting sludge beds contribute to the enrichment of the stream, degrade habitat quality, and can act as a source of bacterial contamination.

Onsite wastewater systems like household sewage treatment systems (HSTSs) also contribute to the contamination. HSTSs discharging directly to a stream or river, such as many aeration or illicit systems, behave similarly to a point source. These types of systems primarily affect water quality under dry, low-flow conditions. HSTSs discharging indirectly to a stream via failed leaching tile fields or intermittent ditch may exhibit effects similar to a nonpoint source. Wastewater discharged to a dry tile or ditch may be of insufficient volume to sustain flow to the stream, but pollutants can accumulate and eventually be flushed by rainfall. These types of septic systems primarily affect water quality under wet-weather, high-flow conditions.

For more detailed information on sources of impairments to the Olentangy River watershed and its minor sub-watersheds, refer to Chapters 6 and 7 of the final TMDL report.

U.S. EPA finds that the TMDL document submitted by OEPA satisfies all requirements concerning this first element.

2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable State/Tribal water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy. (40 C.F.R. §130.7(c)(1)). EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

The TMDL submittal must identify a numeric water quality target(s) – a quantitative value used to measure whether or not the applicable water quality standard is attained. Generally, the pollutant of concern and the numeric water quality target are, respectively, the chemical causing the impairment and the numeric criteria for that chemical (e.g., chromium) contained in the water quality standard. The TMDL expresses the relationship between any necessary reduction of the pollutant of concern and the attainment of the numeric water quality target. Occasionally, the pollutant of concern is different from the pollutant that is the subject of the numeric water quality target (e.g., when the pollutant of concern is phosphorus and the numeric water quality target is expressed as Dissolved Oxygen (DO) criteria). In such cases, the TMDL submittal should explain the linkage between the pollutant of concern and the chosen numeric water quality target.

Comments:

The submitted TMDL report by OEPA focuses on the impairments affecting the recreational and aquatic life beneficial uses applicable to the Olentangy River watershed. Four aquatic life beneficial use designations are applicable in the Olentangy watershed: Warmwater Habitat (WWH), Exceptional Warmwater Habitat (EWH), Cold Water Habitat (CWH), and Modified Warmwater Habitat (MWH). Two recreational use designations are applicable to stream and river segments in the Olentangy watershed: Primary Contact Recreation (PCR) and Secondary Contact Recreation (SCR). Use designations are defined in paragraph (B) of rule 3745-1-07 of the OAC and are assigned in rules 3745-1-08 to 3745-1-32. The attainment of uses in Ohio waters is based on specific numeric and narrative criteria.

The attainment of the aquatic life use requires meeting numeric biological criteria (biocriteria) that is based on the health of the aquatic biological community. The biocriteria consist of the Index of Biotic Integrity (IBI), the Modified Index of Well-being (MIWb), and the Invertebrate Community Index (ICI). The IBI and MIWb measure the fish community while the ICI measures the invertebrate community. These biocriteria form the basis of the numerical targets for the TMDLs developed by OEPA. The biocriteria applicable in the Olentangy River watershed are presented in Table 3 below, and Table 3.1 of the final TMDL submittal document. Biocriteria do not currently exist for CWH; attainment is determined on a case-by-case basis.

Table 3

IBI Biological Index			
Watershed Size	WWH	EWH	MWH
Headwaters (H)- drainage area < 20 Mi ²	40	50	24
Wadeable (W)- drainage area 20-200 Mi ²	40	50	24
Small Rivers (SR)- drainage area >200Mi ²	42	48	24
MIWB Biological Index			
Watershed Size	WWH	EWH	MWH
Headwaters (H)- drainage area < 20 Mi ²	NA	NA	NA
Wadeable (W)- drainage area 20-200 Mi ²	8.3	9.6	4.0
Small Rivers (SR)- drainage area >200Mi ²	8.5	9.6	4.0
ICI Biological Index			
Watershed Size	WWH	EWH	MWH
All	36	46	22

In addition to the biocriteria, chemical water quality criteria may also be established as a surrogate for direct measurement of the aquatic biological community to allow a determination if a particular pollutant is present in amounts that are projected to cause impairment in an aquatic biological community. In this case, the target pollutants selected for the Olentangy River watershed TMDL development are total phosphorus, total suspended solids, and fecal coliform.

Ohio's standards include narrative criteria for suspended solids and nutrients which limits the quantity of suspended solids and nutrients which may enter the waters. Ohio's standards (OAC 3745-1-04) state that all waters of the state shall be free from suspended solids and other substances that enter the waters as a result of human activity and that will settle to form objectionable sludge deposits, or that will adversely affect aquatic life. These standards also state that all waters of the state shall be free from nutrients entering the waters as a result of human activity in concentrations that create nuisance growths of aquatic weeds and algae. Since Ohio currently has no statewide numeric criteria that can be used to assess TSS and nutrient concentrations, potential targets that were identified in a technical report entitled *Association between Nutrients, Habitat, and the Aquatic Biota in Ohio Rivers and Streams* (OEPA, 1999) are being used by OEPA as the proposed TSS and nutrients (total phosphorus) TMDL targets (Table 4 below, and Table 5.1 of the final TMDL submittal document).

Table 4

Total Suspended Solids (mg/l) by Use Designation		
Watershed Size	WWH	EWH
Headwaters (H)- drainage area < 20 Mi ²	10	10
Wadeable (W)- drainage area 20-200 Mi ²	31	26
Small Rivers (SR)- drainage area >200Mi ²	44	41
Total Phosphorus (mg/l) by Use Designation		
Watershed Size	WWH	EWH
Headwaters (H)- drainage area < 20 Mi ²	0.07	0.05
Wadeable (W)- drainage area 20-200 Mi ²	0.11	0.08
Small Rivers (SR)- drainage area >200Mi ²	0.16	0.16

OEPA is also using the Qualitative Habitat Evaluation Index (QHEI) scores as a surrogate numerical target to assess the impacts of sedimentation and habitat alteration (Sections 5.3 and 8.2 of the final TMDL report). The QHEI is a quantitative index that combines the scores given to six physical stream/riparian variables, to assess the physical habitat quality of streams and rivers. This index measures the important components of stream habitat that are essential to sustaining high value aquatic communities. The variables included in the index are: substrate, instream cover, riparian characteristics (riparian width, flood plain quality and bank erosion), channel characteristics, pool/riffle quality, and gradient/drainage area. The substrate, riparian characteristic, and channel metrics all evaluate stream attributes related to sediment bedload and related flow alteration. The substrate metric includes an assessment of streambed sediment quality, quantity, and origin. The riparian metric evaluates riparian width, quality, and bank erosion. The channel metric describes stream physical morphology including sinuosity and extent of development. Each of these factors influences the degree to which siltation and related flow alteration affect a stream, and cumulatively serves as its numeric target.

The habitat and bedload targets determined by OEPA per aquatic life use designation are shown in the Table 5 below, Table 5.2 and Table 8.8 of the final TMDL submittal document. OEPA believes that achieving these targets will result in the biotic community meeting its appropriate designated use.

Table 5

Attribute	Target by Use Designation	
	WWH	EWH
Habitat		
Overall QHEI	≥60	≥75
Bedload		
Substrate	≥13	≥15
Channel	≥14	≥15
Riparian	≥5	≥5

For the Olentangy River watershed TMDL report, fecal coliform was used as the indicator organism to evaluate attainment of recreation uses. Ohio’s statewide numerical and narrative criteria for primary contact recreational use designation require that for each designation at least one of the two bacteria standards (fecal coliform or E. coli) must be met. Ohio’s bacteria standard criteria states that the geometric mean value, based on not less than five samples within a thirty-day period, shall not exceed 1,000 colony forming units (CFU) per 100 ml and shall not exceed 2,000 CFU per 100 ml in more than 10 percent of the samples taken during any thirty-day period. The bacteria target selected by OEPA for the modeling is the WQS used to compare to the geometric mean of the sample values, 1000 counts (or MPN)/100 ml.

In summary, the health of the aquatic biological community (biocriteria) in combination with chemical water quality criteria will be used by OEPA for the attainment of WQS in the Olentangy River watershed TMDLs. Reductions in sediment (bedload and TSS) and nutrient (total phosphorus) loadings can make improvements in the habitat quality, flow regime and water quality. Phosphorus loadings may also be particularly important in supporting the persistence and re-

growth of fecal coliform bacteria in sediments. Improvements in the WQ will cause improvements to the physical habitat and the biological community that will in turn be reflected in the attainment of the aquatic life use for these subwatersheds.

U.S. EPA finds that the TMDL document submitted by OEPA satisfies all requirements concerning this second element.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

A TMDL must identify the loading capacity of a waterbody for the applicable pollutant. EPA regulations define loading capacity as the greatest amount of a pollutant that a water can receive without violating water quality standards (40 C.F.R. §130.2(f)).

The pollutant loadings may be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. §130.2(i)). If the TMDL is expressed in terms other than a daily load, e.g., an annual load, the submittal should explain why it is appropriate to express the TMDL in the unit of measurement chosen. The TMDL submittal should describe the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In many instances, this method will be a water quality model.

The TMDL submittal should contain documentation supporting the TMDL analysis, including the basis for any assumptions; a discussion of strengths and weaknesses in the analytical process; and results from any water quality modeling. EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

TMDLs must take into account *critical conditions* for stream flow, loading, and water quality parameters as part of the analysis of loading capacity. (40 C.F.R. §130.7(c)(1)). TMDLs should define applicable *critical conditions* and describe their approach to estimating both point and nonpoint source loadings under such *critical conditions*. In particular, the TMDL should discuss the approach used to compute and allocate nonpoint source loadings, e.g., meteorological conditions and land use distribution.

Comments:

In order to maintain the water quality standards in the Olentangy River watershed TMDL, OEPA has determined the allowable loads of total suspended solids (TSS), total phosphorus (TP) and fecal coliform (FC) bacteria. The TP, TSS and FC existing loads, reductions, and allowable loads (TMDLs) calculated by OEPA for the Olentangy River watershed are included in the Table 6 below, and Tables B.6, B.7, B.8 and B.9 of Appendix B of the final TMDL submittal. The loads for TP are given in pounds (lb) per day, the loads for TSS are given in tons (tn) per day, and the loads for fecal coliform bacteria are given in colony counts (cnt) per day.

Table 6

Major Sub-watershed	Pollutant	Total Existing Load	% Reduction	TMDL
Upper Olentangy (HUC 05060001-090)	TP (lb/day)	252.13	72%	69.74
	TSS (tn/day)	100.70	90%	9.83
	FC (cnt/day)	5.50E+13	96%	2.00E+12
Whetstone Creek (HUC 05060001-100)	TP (lb/day)	161.88	57%	69.74
	TSS (tn/day)	72.88	86%	9.83
	FC (cnt/day)	6.52E+13	97%	2.00E+12
Middle Olentangy (HUC 05060001-110)	TP (lb/day)	286.08	52%	136.92
	TSS (tn/day)	74.81	69%	23.51
	FC (cnt/day)	7.14E+13	97%	2.19E+12
Lower Olentangy (HUC 05060001-120)	TP (lb/day)	278.99	0%	292.00
	TSS (tn/day)	76.01	65%	26.40

Table 6

Major Sub-watershed	Pollutant	Total Existing Load	% Reduction	TMDL
	FC (cnt/day)	7.98E+13	90%	8.29E+12

The Soil and Water Assessment Tool (SWAT) model was used by OEPA to simulate the hydrology and predict the nonpoint source loading of sediment (TSS) and nutrients (TP) to the Olentangy River watershed. SWAT results were used to determine the flow volumes for the upper and lower Olentangy watersheds, as well as the Whetstone Creek watershed. USGS gage #03225500, located on the Olentangy River immediately below the Delaware Lake Dam, was used to calculate flow volumes for the middle Olentangy watershed. See Section 8.1.1 of the final TMDL submittal for more information.

SWAT is a watershed-scale model developed, by the United States Department of Agriculture-Agricultural Research Service (USDA-ARS), to predict the impact of land management practices on water, sediment, and nutrient yields in large complex watersheds with varying soils, topography, land use and land management practices. The model used in this study is a customized version of SWAT 2005 that is capable of simulating a restrictive layer of material in the soil profile and its impact on subsurface drainage, watershed hydrology, and pollutant transport. The primary goal of applying SWAT to the Olentangy River watershed was to determine the impact of various management activities on water quality by developing representative management scenarios using statistical data on agriculture, sources of literature applicable to Ohio, and the judgment of experts, extension personnel, local agencies, and producers. For more information pertaining to the SWAT modeling process, see Section 6.2.1 of the final TMDL submittal.

For the fecal coliform (FC) bacteria, OEPA used U.S. EPA's Bacterial Indicator Tool (BIT) to estimate the FC load accumulated within each sub-watershed in the Olentangy River watershed. EPA's Bacterial Indicator Tool creates an accounting of all manure sources and then distributes the total quantity of manure among various methods of disposal. The tool accounts for the waste contribution of livestock and wildlife through direct deposition to cropland, pasture, or forest; barn or feedlot deposition and subsequent field application; or direct deposition in the stream or river. BIT calculated the daily accumulation rate of FC bacteria on each land-use type (counts/acre/day), and the FC load contributed to the stream by livestock with direct access (counts/hour). For additional information on the BIT model, see section 6.2.2 of the final TMDL submittal.

Spreadsheet methods, that use a combination of empirical data and literature or default values, were also used to estimate the fecal coliform loads from bacteria washoff, and point sources such as NPDES dischargers, HSTSs, CSOs and SSOs. Bacteria washoff estimates were made by using the daily land-surface accumulation rate generated by BIT, and a washoff equation which required a daily runoff and a washoff coefficient as inputs. NPDES dischargers' loads from major and several minor dischargers were calculated individually for each facility based upon self-monitoring data. Loads from other minor dischargers were estimated as the product of each facility's design flow and representative water-quality information from a pooled dataset of self-monitoring data. Loads from miscellaneous point sources were calculated based upon observed wastewater flow-rates and representative wastewater-quality values. HSTS loads were estimated as the product of the number persons served by failing systems in each sub-watershed, a per capita wastewater flow rate, and representative wastewater-quality information. CSO and SSO loads were estimated as the product of measured or modeled flow volumes and representative water-quality information.

In addition to the calculated loads presented in Table 6 above, OEPA also used the QHEI score system to assess the impacts of sedimentation. To determine the habitat quality, OEPA used a modified QHEI approach which looks at the relationship between the QHEI scores, modified attributes, and aquatic community performance (1Habitat Target = Total QHEI + Modified Attribute Score + High Influence Attribute Score = 1 + 1 + 1 = 3; WWH = 1 (≥60) + 1 (<2) + 1 (<5) = 3; EWH

= 1 (≥75) + 1 (0) +1 (<3) = 3). To assess sedimentation, OEPA also looked at a subset of those factors of the QHEI which are most directly related to sediment type, quality, build up, and source origin (1Bedload Target = Substrate + Channel + Riparian; WWH = ≥13 + ≥14 + ≥5 = ≥32; EWH = ≥15 + ≥15 + ≥5 = ≥35). See [Table 8.9](#) of the final TMDL submittal for the bedload and habitat score results, and the deviation values from the recommended habitat and bedload targets.

OEPA identified the summer period as the critical condition for sediments (TSS), and nutrients (phosphorus). Summer high flows deliver great amounts of sediments and nutrients into the streams in runoff conditions. Summer low flows concentrate sediments (TSS) and nutrients (phosphorus) because the streams’ assimilative capacity for oxygen-demanding substances is being exceeded. As phosphorus readily attaches to sediment, detachment of adsorbed phosphorus in bottom sediments can lead to elevated in-stream concentrations regardless of the magnitude of short-term loads. As a result, it is the long-term or chronic phosphorus load and sediment load that is more directly related to the degradation of water quality. In order to account for the critical condition, the TMDLs for TSS and TP were developed on an annual basis.

OEPA determined that the critical stream condition for bacteria is a “first flush” situation during the summer when pre-storm flows are the lowest and build-up of bacteria is at its highest. The TMDLs accounted for the critical condition for bacteria by developing the TMDLs for the recreational contact period (May to October) which covers the summer season.

U.S. EPA finds that the TMDL document submitted by OEPA satisfies all requirements concerning this third element.

4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity attributed to existing and future nonpoint sources and to natural background. Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. §130.2(g)). Where possible, load allocations should be described separately for natural background and nonpoint sources.

Comments:

The total phosphorus (TP), suspended solids (TSS), and fecal coliform (FC) nonpoint source (NPS) loads, percent reductions, and LAs calculated by OEPA for the Olentangy River watershed TMDLs are included in the [Table 7](#) below, and [Tables B.6, B.7, B.8](#) and [B.9](#) of Appendix B of the final TMDL submittal document. The loads for TP are given in pounds (lb) per day, the loads for TSS are given in tons (tn) per day, and the loads for fecal coliform bacteria are given in colony counts (cnt) per day. The existing NPS category covers runoff and groundwater inputs from agricultural, urban and forested lands, and direct animal inputs from grazing livestock with stream access.

Table 7

Minor Sub-watershed (HUC)	05060001-090			05060001-100			05060001-110			05060001-120		
	TP (lb/day)	TSS (tn/day)	FC (cnt/day)	TP (lb/day)	TSS (tn/day)	FC (cnt/day)	TP (lb/day)	TSS (tn/day)	FC (cnt/day)	TP (lb/day)	TSS (tn/day)	FC (cnt/day)
NPS Existing Load												
<i>Runoff, Tile, Groundwater</i>	198.48	100.49	2.51E+13	131.22	72.83	3.76E+13	263.95	74.69	3.17E+13	159.30	71.44	6.50E+11
<i>Livestock Access</i>	0.00	0.00	2.03E+12	0.00	0.00	1.84E+12	0.00	0.00	8.91E+12	0.00	0.00	0.00E+00
Total	198.48	100.49	2.71E+13	131.22	72.83	3.95E+13	263.95	74.69	4.06E+13	159.72	71.45	6.50E+11

Table 7

Minor Sub-watershed (HUC)	05060001-090			05060001-100			05060001-110			05060001-120		
Pollutant	TP (lb/day)	TSS (tn/day)	FC (cnt/day)	TP (lb/day)	TSS (tn/day)	FC (cnt/day)	TP (lb/day)	TSS (tn/day)	FC (cnt/day)	TP (lb/day)	TSS (tn/day)	FC (cnt/day)
NPS % Reduction												
Runoff, Tile, Groundwater	79%	90%	92%	59%	87%	95%	56%	69%	93%	9%	65%	0%
Livestock Access	—	—	100%	—	—	100%	—	—	100%	—	—	—
Total	79%	90%	92%	59%	87%	95%	56%	69%	95%	9%	65%	0%
LA												
Runoff, Tile, Groundwater	40.81	9.70	1.99E+12	53.67	9.78	1.99E+12	115.02	23.46	2.18E+12	145.20	24.74	6.50E+11
Livestock Access	0.00	0.00	0.00E+00	0.00	0.00	0.00E+00	0.00	0.00	0.00E+00	0.00	0.00	0.00E+00
Total LA	40.81	9.70	1.99E+12	53.67	9.78	1.99E+12	115.02	23.46	2.18E+12	145.20	24.74	6.50E+11

U.S. EPA finds that the TMDL document submitted by OEPA satisfies all requirements concerning this fourth element.

5. Wasteload Allocations (WLAs)

EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to individual existing and future point source(s) (40 C.F.R. §130.2(h), 40 C.F.R. §130.2(i)). In some cases, WLAs may cover more than one discharger, e.g., if the source is contained within a general permit.

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQSs and does not result in localized impairments. These individual WLAs may be adjusted during the NPDES permitting process. If the WLAs are adjusted, the individual effluent limits for each permit issued to a discharger on the impaired water must be consistent with the assumptions and requirements of the adjusted WLAs in the TMDL. If the WLAs are not adjusted, effluent limits contained in the permit must be consistent with the individual WLAs specified in the TMDL. If a draft permit provides for a higher load for a discharger than the corresponding individual WLA in the TMDL, the State/Tribe must demonstrate that the total WLA in the TMDL will be achieved through reductions in the remaining individual WLAs and that localized impairments will not result. All permittees should be notified of any deviations from the initial individual WLAs contained in the TMDL. EPA does not require the establishment of a new TMDL to reflect these revised allocations as long as the total WLA, as expressed in the TMDL, remains the same or decreases, and there is no reallocation between the total WLA and the total LA.

Comments:

The total phosphorus (TP), suspended solids (TSS), and fecal coliform (FC) point source (PS) loads, percent reductions, and WLAs calculated by OEPA for the Olentangy River watershed TMDLs are included in the [Table 8](#) below and [Tables B.6, B.7, B.8 and B.9](#) of Appendix B of the final TMDL submittal document. The loads for TP are given in pounds (lb) per day, the loads for TSS are given in tons (tn) per day, and the loads for fecal coliform bacteria are given in colony counts (cnt) per day. The existing PS category covers existing NPDES regulated facility dischargers (major WWTP, minor WWTP and miscellaneous dischargers), municipal separate stormwater systems (MS4), combine sewer overflows (CSO), sanitary sewer overflows (SSO), and home sewage treatment systems (HSTS).

Table 8

Minor Sub-watershed (HUC)	05060001-090			05060001-100			05060001-110			05060001-120		
	TP (lb/day)	TSS (tn/day)	FC (cnt/day)	TP (lb/day)	TSS (tn/day)	FC (cnt/day)	TP (lb/day)	TSS (tn/day)	FC (cnt/day)	TP (lb/day)	TSS (tn/day)	FC (cnt/day)
PS Existing Load												
Major NPDES	43.06	0.08	3.75E+09	0.00	0.00	0.00E+00	10.43	0.01	2.00E+09	65.43	0.07	5.41E+09
Minor NPDES	3.56	0.01	5.42E+09	24.99	0.03	8.17E+09	4.32	0.01	6.94E+09	5.50	0.01	9.46E+09
Miscellaneous NPDES	0.26	0.01	0.00E+00	0.01	0.00	0.00E+00	0.00	0.00	0.00E+00	0.16	0.01	0.00E+00
MS4	0.62	0.08	2.32E+09	0.00	0.00	0.00E+00	0.60	0.07	2.02E+09	31.38	4.38	4.11E+10
HSTS	6.16	0.02	2.79E+13	5.67	0.02	2.57E+13	6.79	0.03	3.08E+13	16.71	0.06	7.58E+13
CSO	0.00	0.00	0.00E+00	0.00	0.00	0.00E+00	0.00	0.00	0.00E+00	0.55	0.06	9.05E+11
SSO	0.00	0.00	0.00E+00	0.00	0.00	0.00E+00	0.00	0.00	0.00E+00	0.42	0.02	2.83E+12
Total	53.65	0.20	2.79E+13	16.07	0.04	1.07E+10	22.14	0.11	3.08E+13	119.27	4.56	7.63E+13
PS % Reduction												
Major NPDES	48%	0%	0%	—	—	—	—	0%	0%	0%	0%	0%
Minor NPDES	0%	0%	0%	45%	0%	0%	0%	0%	0%	0%	0%	0%
Miscellaneous NPDES	0%	0%	—	0%	0%	—	0%	0%	—	0%	0%	0%
MS4	79%	90%	92%	—	—	—	56%	69%	93%	9%	65%	0%
HSTS	60%	47%	100%	60%	47%	100%	60%	47%	100%	60%	47%	100%
CSO	—	—	—	—	—	—	—	—	—	44%	75%	100%
SSO	—	—	—	—	—	—	—	—	—	100%	100%	100%
Total	46%	40%	97%	—	—	—	1%	55%	99%	—	64%	99%
WLA												
Major NPDES	22.53	0.08	3.75E+09	0.00	0.00	0.00E+00	14.60	0.01	2.00E+09	105.54	0.07	5.41E+09
Minor NPDES	3.56	0.01	5.42E+09	13.80	0.03	8.17E+09	4.32	0.01	6.94E+09	5.50	0.01	9.46E+09
Miscellaneous NPDES	0.26	0.01	0.00E+00	0.01	0.00	0.00E+00	0.00	0.00	0.00E+00	0.16	0.01	0.00E+00
MS4	0.13	0.01	1.85E+08	0.00	0.00	0.00E+00	0.26	0.02	1.39E+08	28.60	1.52	4.11E+10
HSTS	2.46	0.01	2.79E+09	2.27	0.01	2.57E+09	2.71	0.01	3.08E+09	6.68	0.03	7.58E+09
CSO	0.00	0.00	0.00E+00	0.00	0.00	0.00E+00	0.00	0.00	0.00E+00	0.31	0.02	4.53E+09
SSO	0.00	0.00	0.00E+00	0.00	0.00	0.00E+00	0.00	0.00	0.00E+00	0.00	0.00	0.00E+00
Total WLA	28.94	0.12	1.22E+10	16.07	0.04	1.07E+10	21.90	0.05	1.22E+10	146.80	1.66	6.81E+10

OEPA also calculated the TP, TSS, and FC individual WLAs for the individual NPDES regulated point sources in the Olentangy River watershed TMDLs. Tables 9A, 9B and 9C below contain the estimated daily loads of TP, TSS, and FC for the individual point source NPDES permitted facilities in the Olentangy River watershed.

Table 9A

Major Sub-watershed (HUC)	Major WWTP Facility	NPDES Permit #	WLA		
			TP lb/day ¹	TSS tn/day ²	FC cnt/day ³
05060001-090	City of Galion	2PD00030	23	0.082	3.76E+09
05060001-100	Candlewood Lake	4PU00005	3	0.004	2.51E+09
	Mt. Gilead	4PB00102	7	0.020	1.88E+09
	Cardington	4PA00100	4	0.007	9.05E+08
05060001-110	Marion County	2PJ00002	15	0.005	2.01E+09
05060001-120	City of Delaware	4PD00004	66	0.063	1.69E+09
	Delaware County	4PK00001	40	0.012	3.72E+09

¹ TP and TSS daily loads were calculated by dividing the annual loads presented in Tables 8.2 of the final TMDL submittal by the 365 days contained in the year. Also refer to e-mail from OEPA dated 8/13/07.

² TP and TSS daily loads were calculated by dividing the annual loads presented in 7.2, 7.6, 7.10 and 7.16 of the final TMDL submittal by the 365 days contained in the year. Also refer to e-mail from OEPA dated 8/13/07.

³ FC daily loads were calculated by dividing the seasonal loads presented in Tables 7.2, 7.6, 7.10 and 7.16 of the final TMDL submittal by the 168 days contained in OH recreational season period (May 1 to October 15). Also refer to e-mail from OEPA dated

Table 9B

Major Sub-watershed (HUC)	Minor WWTP Facility	NPDES Permit #	WLA		
			TP lb/day ³	TSS tn/day ³	FC cnt/day ⁴
05060001-090	Caledonia	2PA00035	3.01	0.0070	4.52E+09
	General Mills Operations	2IH00106	0.04	0.0001	7.50E+07
	Glen Gery Corporation	2IJ00074	0.04	0.0001	7.50E+07
	Specialty Fertilizer Products	4IF00100	0.04	0.0001	7.50E+07
	Spring Valley MHP	2PY00023	0.25	0.0006	3.76E+08
	Swiss Village MHP	2PR00099	0.20	0.0005	3.01E+08
05060001-100	Edison	4PA00000	0.14	0.0003	2.60E+09
	Northmoor Local Schools	4PT00110	0.14	0.0003	2.82E+08
05060001-110	Blue Willow MHP	2PR00039	0.38	0.0009	5.64E+08
	Marion Co. Sewer District #5A	2PG00035	2.50	0.0058	3.76E+09
	River Bend Corporation (Outfall #001)	2PR00189	0.08	0.0002	1.88E+08
	River Bend Corporation (Outfall #002)	2PR00189	0.13	0.0003	2.82E+08
	United Mobile Homes	2PY00015	0.75	0.0018	1.13E+09
	Verizon North	2PR00115	0.43	0.0010	9.40E+08
	Waldo Duchess Store	2PR00062	0.05	0.0001	7.50E+07
05060001-120	Adrian Subdivision	4PW00005	0.75	0.0018	1.13E+09
	Buckeye Valley School	4PT00107	0.65	0.0015	1.32E+09
	Chef-Is-In, Inc.	4PX00001	0.10	0.0002	1.51E+08
	City of Delaware	4IW00050	0.10	0.0002	1.51E+08
	Crystal Lake MHP	4PV00010	0.60	0.0014	9.05E+08
	Delaware JVS	4IM00006	0.19	0.0004	3.76E+08
	Delaware MHP	4PV00106	0.25	0.0006	3.76E+08
	Methodist Theological School	4PR00025	0.46	0.0001	9.40E+08
	Nissan North	4PX00012	0.04	0.0001	7.50E+07
	Olentangy Local Schools	4PT00002	0.65	0.0015	1.32E+09
	Shroyers MHP	4PV00095	0.50	0.0012	7.50E+08
	Speedway Super America	4PX00024	0.04	0.0001	5.64E+07
	USDA Forest Exp. Station	4PN00001	0.21	0.0005	4.52E+08
	Worthington Arms MHP	4PV00093	0.98	0.0023	1.47E+09

³ TP and TSS daily loads were calculated by dividing the annual loads presented in Table B.2 of Appendix B of the final TMDL submittal by 365 days contained in the year. Also refer to e-mail dated 8/13/07.

⁴ FC daily loads were calculated by dividing the seasonal loads presented in Table B.2 of Appendix B of the final TMDL submittal by the 168 days contained in OH recreational season period (May 1 to October 15). Also refer to e-mail from OEPA dated 8/13/07.

Table 9C

Major Sub-watershed (HUC)	Miscellaneous Discharger	NPDES Permit #	WLA		
			TP lb/day ⁵	TSS tn/day ⁵	FC cnt/day ⁶
05060001-090	Glen Gery Corporation	2IJ00074	0.2515	0.01258	0
	Marathon Ashland Pipeline	2IG00028	0.0049	0.00005	0
05060001-100	Marathon Ashland Pipeline	4IN00029	0.0049	0.00005	0
05060001-110	BP Oil Co.	4IN00168	0.0003	0.00000	0
	City of Delaware WTP	4IW00050	0.0104	0.00126	0
	Wilamette Industries	4IN00031	0.0008	0.00008	0
05060001-120	Battelle Institute	4IN00012	0.0310	0.00031	0
	City of Delaware WTP	4IW00050	0.0104	0.00126	0
	Del Co Water	4IW00052	0.0249	0.00101	0
	Evans Adhesives	4IN00099	0.0019	0.00019	0
	National Electric Coil (Outfall #001)	4IS00012	0.0003	0.00003	0
05060001-120	National Electric Coil (Outfall #004)	4IS00012	0.0003	0.00066	0
	Ohio DOT Aviation	4IN00177	0.0721	0.00060	0
	Sunsprout Farms	4IN00051	0.0011	0.00008	0
	Worthington Hills WTP	4IW00021	0.0205	0.00082	0

⁵ TP and TSS daily loads were calculated by dividing the annual loads presented in Table B.3 of Appendix B of the final TMDL submittal by 365 days contained in the year. Also refer to e-mail from OEPA dated 8/13/07.

⁶ FC daily loads were calculated by dividing the seasonal loads presented in Table B.3 of Appendix B of the final TMDL submittal by the 168 days contained in OH recreational season period (May 1 to October 15). Also refer to e-mail from OEPA dated 8/13/07.

U.S. EPA finds that the TMDL document submitted by OEPA satisfies all requirements concerning this fifth element.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). EPA's 1991 TMDL Guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

Comments:

OEPA incorporated an implicit margin of safety into the total phosphorus (TP), and total suspended solids (TSS) for the Olentangy River watershed. An implicit margin of safety was incorporated through the use of more conservative and restrictive targets. A conservative assumption implicit in the target development lies in the selection of the median statistic used to represent the phosphorus and TSS targets for the WWH streams and the 75th percentile for EWH streams that corresponds to an unimpaired biological community. Since Ohio EPA's evaluation of data for generating target values is based on measured performance of aquatic life and since full attainment can be observed at concentrations above these targets (reinforcing the concept that habitat and other factors play an important role in supporting fully functioning biological communities), water quality attainment can occur at levels higher than the targets. The difference between the actual level where attainment can be achieved and the selected target is an implicit margin of safety.

OEPA also incorporated an implicit margin of safety into the fecal coliform bacteria TMDLs for the Olentangy River watershed. The fecal coliform load to the streams in each sub-watershed was quantified, as was the fecal coliform loading capacity, at the outlet of each sub-watershed. The loading capacity was calculated as the product of the seasonal flow volume and the fecal coliform target concentration. No attempt was made to link downstream loading capacity with upstream loading via in-stream processing. Rather, the load reductions recommended by this report are based upon a direct comparison between the two quantities. In reality, considerable die-off occurs between the source of loading and the TMDL endpoint and this loss represents an implicit margin of safety.

U.S. EPA finds that the TMDL document submitted by OEPA contains an appropriate MOS satisfying all requirements concerning this sixth element.

7. Seasonal Variation

The statute and regulations require that a TMDL be established with consideration of seasonal variations. The TMDL must describe the method chosen for including seasonal variations. (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

Comments:

OEPA accounted for seasonality by using aquatic life indices. Biological and habitat indices are measures of aggregate annual conditions reflecting compounding factors over time. The use of these indices reflects the collective seasonal effects on the biota. The measurement of these indices during the summer period reflects the biotic performance during critical conditions.

Seasonality was also accounted in OEPA's development of sediment and nutrient TMDLs through the use of the SWAT model to simulate the hydrology and estimate on an annual basis the loadings to the Olentangy River watershed. This incorporated seasonal and hydrologic variability into the TMDL calculations to ensure the calculated loads would be protective for all conditions including critical ones.

Seasonality was also considered in OEPA's development of the pathogen TMDLs for the summer recreational contact period of May 1 to October 15 in consideration of the critical condition.

U.S. EPA finds that the TMDL document submitted by OEPA satisfies all requirements concerning this seventh element.

8. Reasonable Assurances

When a TMDL is developed for waters impaired by point sources only, the issuance of a National Pollutant Discharge Elimination System (NPDES) permit(s) provides the reasonable assurance that the wasteload allocations contained in the TMDL will be achieved. This is because 40 C.F.R. 122.44(d)(1)(vii)(B) requires that effluent limits in permits be consistent with "the assumptions and requirements of any available wasteload allocation" in an approved TMDL.

When a TMDL is developed for waters impaired by both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur, EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

EPA's August 1997 TMDL Guidance also directs Regions to work with States to achieve TMDL load allocations in waters impaired only by nonpoint sources. However, EPA cannot disapprove a TMDL for nonpoint source-only impaired waters, which do not have a demonstration of reasonable assurance that LAs will be achieved, because such a showing is not required by current regulations.

Comments:

There are two watershed organizations that are active in the Olentangy River basin: FLOW (Friends of the Lower Olentangy Watershed) and OWA (the Olentangy Watershed Alliance). FLOW plays a strong public education role in urbanized Franklin and rapidly developing southern Delaware Counties, and focuses on urban and transitional suburban water quality issues. OWA focuses on centering the agricultural landscapes of the upper watershed in northern Delaware, Morrow, Marion and Crawford Counties. Both watershed organizations evolved with the funding support of OEPA 319 grants and have produced or co-produced a watershed plan under OEPA 319 funding support. The FLOW plan, addressing urban and suburban challenges, was fully endorsed by ODNR and OEPA in 2006. Full state endorsement is presently pending for "The Upper Olentangy Watershed Action Plan". Multiple action items contained in these watershed plans parallel the topics and recommendations contained in the Olentangy River watershed TMDL report. Both OWA and FLOW actively participate on the plenary Olentangy TMDL Team.

Reasonable assurances for point source controls include:

- *NPDES Program*: Through the NPDES program, the OEPA will use its authority to ensure that recommended effluent limits are applied to the appropriate permit holders within the Olentangy River watershed. OEPA staff in the NPDES Program can provide technical assistance for permitted entities when needed. Permits issued under the NPDES program must be consistent with the point source recommendations in a TMDL that has been approved by the U.S. EPA.
- *Combined Sewer Overflow Program*: Through the CSO program, the OEPA will use its authority to ensure that recommended control activities are conducted by the permit holders within the Olentangy River watershed.
- *Stormwater Program*: Through the Stormwater Program, the OEPA will ensure that the stormwater permit related recommendations of this TMDL report are applied, including development of a special general stormwater permit for construction activities in a specified area of the Olentangy watershed. Staff within the Stormwater Program will provide technical assistance to permitted entities when needed. District Office staff within the Stormwater Program will respond to and investigate complaints received by individuals and organizations. In the Olentangy River watershed, the City of Powell, Orange and Liberty townships and Delaware County are designated Phase II communities and have initiated stormwater programs which include construction site permitting and inspections, good housekeeping training, and public outreach and education. These communities work with the Delaware Soils and Water Conservation District and have participated in activities sponsored by the FLOW. Through their commitment to their storm water programs there is opportunity to proactively address storm water sources of impairment in some of the rapidly developing area of the watershed.
- *401 Water Quality Certification Program*: In Ohio, anyone wishing to discharge dredged or fill material into the waters of the United States, regardless of whether on private or public property, must obtain a Section 404 permit from the U.S. Army Corps of Engineers (USACE) and a Section 401 Water Quality Certification (WQC) from the state. Through the Section 401 Water Quality Certification (WQC) Program, OEPA staff will conduct reviews and issue permits to provide the most reasonable protections and improvements (mitigation through restoration, creation, or other forms of enhancement) of surface waters in the Olentangy River watershed.
- *Wetland Protection Program*: House Bill 231 established a permanent permitting process for isolated wetlands. OEPA staff in the 401 WQC Section will conduct reviews and issue permits to provide the most reasonable protections and improvements of surface waters in the Olentangy River watershed.
- *Enforcement Program*: When OEPA is unable to resolve continuing water quality problems due to violations of permitting rules or laws, the Division of Surface Water may recommend that enforcement action be taken. The enforcement and compliance staffs work with OEPA attorneys, as well as the Attorney General's Office to resolve these cases. All completed enforcement actions are posted on the DSW web page.

Reasonable assurances for non-point source controls include:

- *Nonpoint Source Program*: The Ohio Nonpoint Source program focuses on identifying and supporting implementation of management practices and measures that reduce pollutant loadings, control pollution from nonpoint sources and improve the overall quality of these waters. OEPA receives federal Section 319(h) funding to implement a statewide nonpoint source program, including offering grants to address nonpoint sources of pollution. Staff from the NPS program work with state and local agencies, governments, watershed groups, and citizens.
In addressing sources of impairment related to agricultural activities, NPS staff will correspond with Ohio Department of Natural Resources (ODNR) to promote BMPs as well as cost-share and incentive based conservation programs. In particular, OEPA will encourage the ODNR to continue to work with Farm Service Agency personnel and staff from local SWCD and NRCS

offices. NPS staff will also provide assistance to agencies and groups actively promoting conservation as well as direction to other appropriate resources within the OEPA.

NPS staff will continue to work with the two watershed groups (OWA and FLOW) that are active in the Olentangy River basin, each with a watershed management plan. Local NPS implementation is critical to achieving state environmental targets. Additionally, there is a reliance on watershed management plans to identify and outline actions to correct water quality problems caused by NPS pollution.

Section 319(h) grants are expected to be directed to projects that eliminate or reduce water quality impairments caused by nonpoint sources of pollution. Applicants may apply for a maximum of \$500,000 for a three year period. Each project funded must provide an additional 40% matching share and the total federally funded share of project costs may not exceed 60%. Because a TMDL exists, grant proposals for work within the Olentangy River watershed will receive special consideration for funding.

- 208 Program (State Water Quality Management Plans): The Olentangy River TMDL will become a part of the State Quality Management (WQM) Plan when it is approved by the U.S. EPA and the recommendations found herein align with and support the state's overall plan for clean waters.
- Pollution Abatement Program: ODNR in cooperation with Soil and Water Conservation Districts (SWCD) can use the Pollution Abatement Program to safeguard against chronic problems related to agricultural pollution that lead to the degradation of water quality within the Olentangy River watershed. This program requires that, in cases of agricultural pollution, an operation and management plan has to be generated to abate the pollution. This plan which is approved by the SWCD or ODNR has to be implemented by the landowner.
- SWCD Program: Through the partnership established by the ODNR and SWCD working agreement, ODNR can communicate the goals and recommendations highlighted in the Olentangy river watershed TMDL report to the SWCDs, and provide guidance to actively promote conservation efforts that are consistent with those goals. An example of this is the U.S. EPA Section 319 grant that has been awarded to ODNR to improve drainage ditch management and assist in promoting buffer strips associated with the Scioto CREP.
- Urban Stormwater Program: ODNR staff from the urban stormwater program will be an important resource for communicating with the development community and promoting storm water management that is consistent with recommendations and goals of the Olentangy River watershed TMDL report.
- Scenic River Program: Scenic River coordinators provided by the Scenic River Program for the 22 continuous miles of scenic river designation along the Olentangy River south of the Delaware Lake dam will be useful resources in communicating with the development community in this part of the watershed and advancing appropriate planning, setbacks, preservation, and management strategies.
- Agricultural Services and Programs: Local Soil and Water Conservation District (SWCD), Natural Resource Conservation Service (NRCS), and Farm Service Agency (FSA) offices provide a series of services and programs to the agricultural community. The typically close working relationships that SWCD and NRCS staff maintain with local land owners and producers make them well suited for promoting sound land management and conservation practices that focus on sediment and erosion controls and water quality protection.

Within the Olentangy River watershed, the SWCD and NRCS staff are currently working with the ODNR in a grant that will fund a two-stage ditch project in the upper part of the Olentangy River watershed. Although two-stage ditching shows promise (see Section 9.1.2 of final TMDL report) it is not yet widely employed nor included as a NRCS practice standard.

Additionally there a series of Federal Farm Bill programs, administered by the local NRCS and FSA offices, which are available to the Olentangy River watershed agricultural community. These include the Environmental Quality Incentives Program (EQIP), the Wetland Reserve

Program (WRP), the Conservation Reserve Program (CRP), and the Conservation Reserve Enhancement Program (CREP).

The Scioto River Watershed CREP is aimed at creating 70,000 acres in a combination of buffers and wetlands on cropland and marginal pastureland throughout the entire Scioto basin. Since the Olentangy River watershed makes up a part of the entire Scioto River Watershed CREP project area (about 8.3% of the total land area), this program can serve as an important means for establishing conservation practices (e.g. buffer strips) in the watershed.

▪ *Other Financial Assistance Programs and Special Projects:*

The Division of Environmental and Financial Assistance (DEFA) provides incentive financing, supports the development of effective projects, and encourages environmentally proactive behaviors through the Ohio Water Pollution Control Loan Fund (WPCLF). DEFA may provide financing to eligible nonpoint pollution control projects and eligible municipal wastewater treatment improvements projects. The Water Resource Restoration Sponsor Program (WRRSP) is a part of the WPCLF and directs funding towards stream protection and restoration projects.

In 2004, Preservation Parks of Delaware County, worked with OEPA's Watershed Resource and Restoration Sponsorship Program, developers and the Boy Scouts of America; to purchase 60 acres of pristine wooded stream corridor (Big Run) and 121 acres of perpetual conservation easements (Camp Lazarus) within two heavily forested tributary ravines flanking the mainstem's east bank in Liberty Township. Both sites experienced increasingly intense development pressure prior to acquisition. The Big Run acreage carries preserve status. In 2006, Preservation Parks accepted a donation of approximately 100 acres within the same township. These acres include two ravines draining to the mainstem. The organization continues to seek high quality lands for acquisition and preservation as parks and preserves throughout Delaware County and the Olentangy River corridor.

A U.S. EPA Section 319(h) grant was awarded in 2005 to fund demonstrations of alternative approaches to drainage. In particular, a two-stage ditch is to be constructed and monitored using these and other funds. In addition, education and outreach is a deliverable of this grant where such alternative drainage management approaches will be disseminated, buffer strips through the Scioto CREP and permanent conservation easements will be promoted. Entities directly or indirectly involved with this project include the ODNR; Morrow, Marion, and Crawford SWCDs; Agricultural Research Service (USDA); Ohio Water Development Authority; Ohio State University; Heidelberg College; and the OEPA. Through this grant several brochures, fact sheets, and workshops and signage will be developed.

For more detailed information on reasonable assurances for the Olentangy River watershed TMDLs, refer to Subchapter 9.3 of the final TMDL report.

U. S. EPA finds that this section has been adequately addressed.

9. Monitoring Plan to Track TMDL Effectiveness

EPA's 1991 document, *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a TMDL involves both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur. Such a TMDL should provide assurances that nonpoint source controls will achieve expected load reductions and, such TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring and leading to attainment of water quality standards.

Comments:

Monitoring of the Olentangy River watershed will be necessary to ensure that the pollutant reduction targets and habitat improvements are accomplished so as to ultimately result in attainment of the aquatic life and recreational uses in the watershed. OEPA is scheduled to perform biological, water quality, habitat, and sediment chemistry monitoring in all four assessment units in the basin in 2018. NPDES permit holders will conduct in-stream water quality chemical monitoring sampling as required in their permits, and OEPA will continue monitoring activities as part of the rotating basin monitoring schedule. Other entities conducting monitoring work include the ODNR (especially through the Scenic Rivers Program), Delaware County General Health District, and the City of Columbus Division of Water and Division of Sewers and Drains. Additionally, there is a proposed 319 grant watershed study to monitor and evaluate the effectiveness of the implementation work (BMPs) to be done in the three HUC-11 sub-basins of the upper Olentangy watershed.

OEPA also recommends that an adaptive management approach, which allows for changes in the management strategy if environmental indicators suggest that the current strategy is inadequate or ineffective, should be taken in the Olentangy River watershed. The recommendation put forth for the Olentangy River watershed largely center on improving in-stream habitat, increasing floodplain connectivity, and the abatement of sediment and nutrients loads. If chemical water quality does not show improvement and/or waterbodies are still not attaining water quality standards after the implementation plan has been carried out, then a TMDL revision would be initiated. The OEPA would initiate the revision if no other parties wish to do so. For further information on monitoring, see Subchapter 9.4 of the final TMDL report.

U.S. EPA finds that this section has been adequately addressed.

10. Implementation

EPA policy encourages Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired by nonpoint sources. Regions may assist States/Tribes in developing implementation plans that include reasonable assurances that nonpoint source LAs established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. In addition, EPA policy recognizes that other relevant watershed management processes may be used in the TMDL process. EPA is not required to and does not approve TMDL implementation plans.

Comments:

In order to achieve the necessary pollutant reductions and habitat improvements to bring the Upper Olentangy River watershed into attainment with WQS, OEPA included a series of potential implementation strategies in the final Olentangy watershed TMDL report. These restoration strategies might include:

- Reduce point sources by:
 - Implementing Combined sewer overflows (CSO) and sanitary sewer overflows (SSO)
 - Enforcing the permit limitations and compliance schedules established through the NPDES program
 - Enforcing storm water Phase I and II regulations
- Reduce loading from home sewage treatment system (HSTS) by:
 - Implementing HSTS plans to:
 - Identify/detect failing systems

- Upgrade/replace as appropriate
 - Protect against future failures through training and education on system maintenance
 - Provide sewers (where feasible)
- Reduce manure sources by:
 - Implementing livestock waste management plans to:
 - Eliminate/reduce livestock access to streams
 - Improve storage and handling operations
 - Improve land application methods and rates
 - Utilize drainage water management
- Reduce overland sources by:
 - Implementing sediment and erosion control practices
 - Protective cover
 - Conservation farming practices
 - Reduce land application
 - Improve timing of fertilizer application
 - Provide stream side buffering (riparian buffers)
 - Conservation tillage
- Increase the assimilative capacity of stream system, the heterogeneity of channel morphology and the flow conditions by:
 - Storm water management plans
 - Dam evaluation and removal plans
 - Flood plain management
 - Flow augmentation
 - Wetland creation and restoration
 - Natural Channel design and stream restoration
 - Two-stage approach to drainage ditches
 - Bio-engineering techniques
 - Low Impact Development
 - Conservation Development
 - Water quality ponds
 - Infiltration trenches
 - Sand and organic filters
 - Grass filters
 - Bioretention area
 - Public education for awareness of watersheds and water quality

OEPA will evaluate the success of the implementation actions resulting from the Olentangy River watershed TMDL by the observed improvements revealed through the biological, water quality, habitat (QHEI), and sediment chemistry monitoring. The analysis of the QHEI biological scores will provide a framework to develop habitat restoration and improvement strategies.

For more detailed information on implementation for the Olentangy River watershed TMDLs, refer to Chapter 9 of the final TMDL report.

Though U.S. EPA is not required to approve an implementation plan as a condition for TMDL approval, U.S. EPA finds that this section has been adequately addressed.

11. Public Participation

EPA policy is that there should be full and meaningful public participation in the TMDL development process. The TMDL regulations require that each State/Tribe must subject calculations to establish TMDLs to public review consistent with its own continuing planning process (40 C.F.R. §130.7(c)(1)(ii)). In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval should describe the State's/Tribe's public participation process, including a summary of significant comments and the State's/Tribe's responses to those comments. When EPA establishes a TMDL, EPA regulations require EPA to publish a notice seeking public comment (40 C.F.R. §130.7(d)(2)).

Provision of inadequate public participation may be a basis for disapproving a TMDL. If EPA determines that a State/Tribe has not provided adequate public participation, EPA may defer its approval action until adequate public participation has been provided for, either by the State/Tribe or by EPA.

Comments:

During the Olentangy River project period, OEPA organized a meeting of individuals representing diverse interests throughout the watershed (The Olentangy Forum). Their interests intersect on themes of water resource use, protection and restoration. The purpose of the day-long meeting was the foundation of an Olentangy watershed network for information, resource sharing and mutual project work. A report on the planned TMDL project was presented to this audience in 2005. The public review draft of the Olentangy watershed TMDL was discussed at the Forum's 2006 meeting in September.

The Olentangy River watershed TMDL report was public noticed from October 17, 2006 through December 1, 2006. Copies of the draft TMDL were available for review at the OEPA, Division of Surface Water web page (www.epa.state.oh.us/dsw/index.html). Comments were received and properly addressed by OEPA. For further information on public participation, see Appendix D of the final TMDL report.

U.S. EPA finds that the TMDL document submitted satisfies all requirements concerning this eleventh element.

12. Submittal Letter

A submittal letter should be included with the TMDL submittal, and should specify whether the TMDL is being submitted for a *technical review* or *final review and approval*. Each final TMDL submitted to EPA should be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State's/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute. The submittal letter, whether for technical review or final review and approval, should contain such identifying information as the name and location of the waterbody, and the pollutant(s) of concern.

Comments:

The U.S. EPA received the formal submission of the final Olentangy River watershed TMDLs on August 30, 2007 along with a cover letter from Chris Korleski, Director, OEPA dated August 24, 2007. The letter explicitly states that this is a final TMDL submittal under Section 303(d) of CWA for EPA review and approval. The letter also contains the waterbody segments names, location, and the causes/pollutants of concern as they were identified on the Ohio's 303(d) list. 11

U.S. EPA finds that the TMDL document submitted satisfies all requirements concerning this eleventh element.

13. Conclusion

After a full and complete review, U.S. EPA finds that the TMDLs for the Olentangy River watershed satisfy all of the elements of approvable TMDLs. This approval addresses the Olentangy River watershed (AU's 05060001-090, 05060001-100, 05060001-110, and 05060001-120) for three (3) pollutants (total phosphorus (TP), sediment (TSS), fecal coliform bacteria (FC)) for a total of 12 TMDLs, addressing 16 impairments (Table 10 below).

U.S. EPA's approval of these TMDLs does not extend to those waters that are within Indian Country, as defined in 18 U.S.C. Section 1151. U.S. EPA is taking no action to approve or disapprove TMDLs for those waters at this time. U.S. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.

Table 10

HUC	FC TMDL	TP TMDL	TSS TMDL	Impairments addressed by TMDLs
05060001-090	✓	✓	✓	Nutrients, Siltation, Habitat Alterations, Flow Alteration
05060001-100	✓	✓	✓	Nutrients, Thermal Modifications, Siltation, Habitat Alterations, Flow Alteration
05060001-110	✓	✓	✓	Siltation, Habitat Alterations, Nutrients, Flow Alteration
05060001-120	✓	✓	✓	Siltation, Nutrients, Flow Alteration