Total Maximum Daily Load Summary

The goal of the Clean Water Act is to have the country's water safe for swimming, fishing and drinking. The Clean Water Act mandates that states identify waters such as streams and lakes that are polluted to the point that they are not safe for swimming, fishing, or drinking. For these polluted waters, the states must also write a report that indicates what the pollutant is and the maximum amount of the pollutant the water can safely handle. This is called a Total Maximum Daily Load, or TMDL, for short. For this report, "water" means a stream or river, not drinking water from a faucet or a well. This summary provides basic information from this report about why a TMDL was calculated and lists the allowable levels for bacteria-polluted streams in the Floyds Fork watershed.

Bacteria are a pollutant because the chance of an illness after swimming, wading, boating or fishing in the water is increased if bacteria numbers are too high. The bacteria themselves may not cause an illness, but when they are high in number other things that can cause an illness, like a virus, may be in the water. Bacteria cells are very small and they tend to grow in groups called "colonies." Because bacteria colonies can be seen by the human eye, they are grown and counted to determine how many bacteria are present.

Kentucky uses two different types of bacteria to tell whether the water is polluted. These are fecal coliform and *E. coli*. Kentucky regulations have numbers for the safe amounts of these bacteria in the water. The numbers are lower in the summer because people swim and wade in the water during the summer and a lower number during the summer is safer. The summer limits are called primary contact recreation (PCR) season criteria while the year round limits are called secondary contact recreation (SCR) season criteria. Kentucky also has two types of numbers for the bacteria: one is a geometric mean and the other is a maximum number. Geometric means are a type of average. Kentucky regulations state that at least five bacteria samples must be taken from the water in thirty days to calculate the geometric mean. Also, the bacteria colonies can not be above the maximum number more than 20% of the time. If the bacteria colonies are above the maximum number more than 20% of the time or if the calculated geometric mean from the water samples is above the legal geometric mean, the water is polluted. Information from Kentucky's regulations on allowable numbers of bacteria colonies in streams is summarized in Table S.1 below.

Table S.1 Kentucky's Bacteria Limits

	Summer PCR Limit (May 1 - Oct. 31)		SCR Limit (year round)	
Bacteria	Geometric Mean (colonies/100 ml)	Maximum (colonies/100 ml)	Geometric Mean (colonies/100 ml)	Maximum (colonies/100 ml)
Fecal coliform	**200** (from 5 samples collected within 30 days)	**400** (number not to be exceeded in more than 20% of the samples)	**1,000** (from 5 samples collected within 30 days)	**2,000** (number not to be exceeded in more than 20% of the samples)
E. coli	**130** (from 5 samples collected within 30 days)	**240** (number not to be exceeded in more than 20% of the samples)	No criterion (this does not mean that any number is safe; rather that Kentucky regulations do not tell the safe limit)	No criterion (this does not mean that any number is safe; rather that Kentucky regulations do not tell the safe limit)

Floyds Fork begins in Henry County, Kentucky, and flows southwest for 62 miles to join the Salt River in Bullitt County (Figure S.1). Floyds Fork also has 105 miles of tributaries. Parts of Henry, Oldham, Shelby, Spencer, Jefferson, and Bullitt Counties provide flow or drain to Floyds Fork and its tributaries. Land areas that drain to Floyds Fork or its tributaries are all in the Floyds Fork watershed. A watershed is an area of land where runoff flows to a point on a stream. A subwatershed is just a smaller area of a larger watershed.

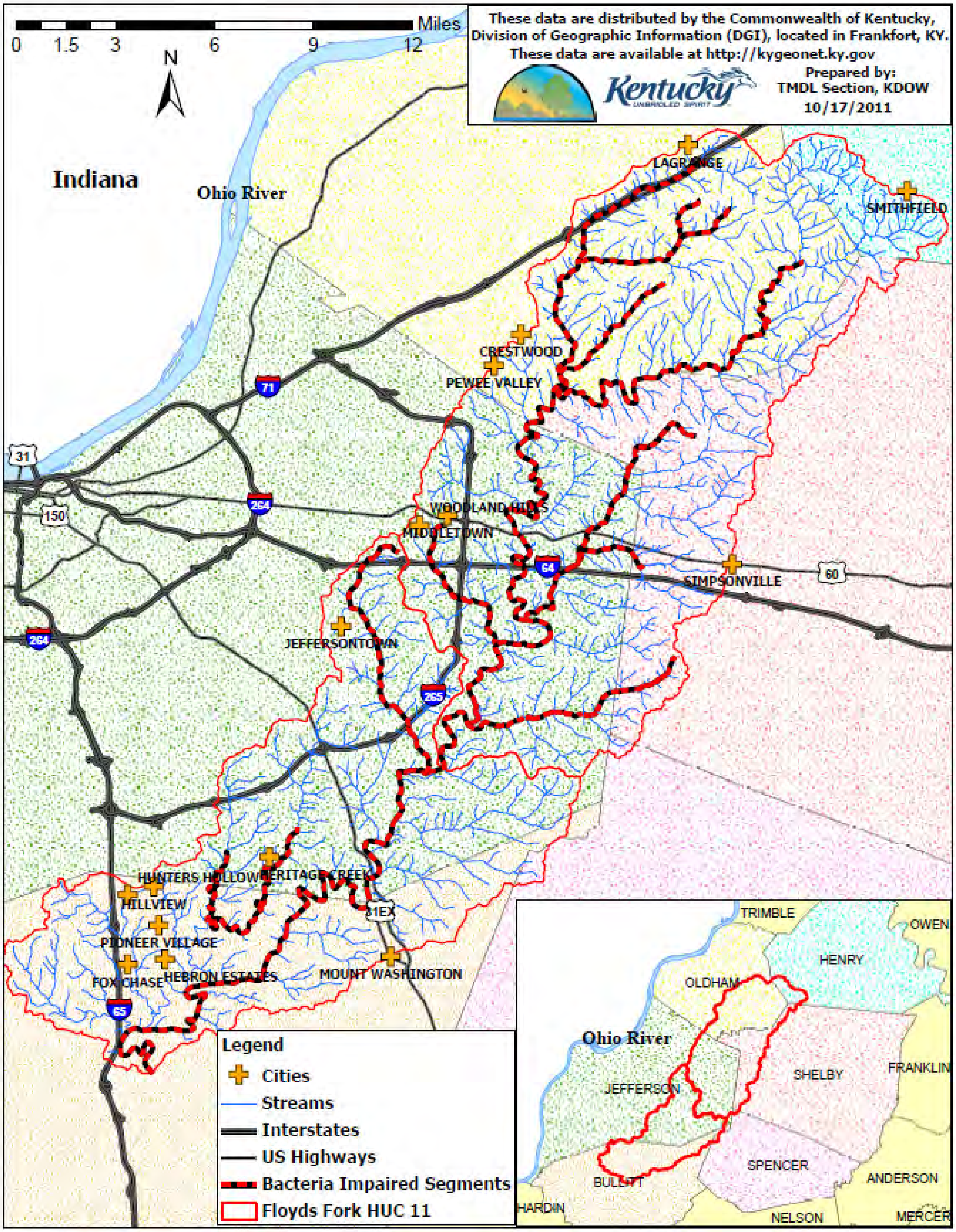

Figure S.1 Location of Floyds Fork Watershed

Some of the streams in the Floyds Fork watershed were identified as polluted because of bacteria during the early 1990s and more polluted streams have been identified since then. The bacteria polluted streams in the Floyds Fork watershed are listed in Table S.2 and shown in red on the map in Figure S.1. The list of streams includes river miles that tell where the bacteria are too high. The stream name and the polluted river miles are called a stream “segment.” A river mile of 0.0 is at the downstream mouth of the stream and river miles increase going upstream. As an example, South Fork Currys Fork 0.0 to 6.1 tells us that the bacteria pollution goes from the downstream end or “mouth” of South Fork Currys Fork and continues for 6.1 miles in the upstream direction on South Fork Currys Fork.

Table S.2 Streams Polluted by Bacteria in the Floyds Fork Watershed

Stream Segment	Bacteria	Season
Ashers Run 0.0 to 4.8	*E. coli*	Summer PCR
Ashers Run 0.0 to 4.8	Fecal coliform	Summer PCR
Cane Run 0.0 to 7.3	*E. coli*	Summer PCR
Cedar Creek 4.3 to 11.1	*E. coli*	Summer PCR
Cedar Creek 4.3 to 11.1	Fecal Coliform	Summer PCR
Chenoweth Run 0.0 to 5.25	*E. coli*	Summer PCR
Chenoweth Run 0.0 to 5.25	Fecal coliform	Summer PCR
Chenoweth Run 0.0 to 5.25	Fecal coliform	Year Round SCR
Chenoweth Run 5.25 to 9.2	*E. coli*	Summer PCR
Chenoweth Run 5.25 to 9.2	Fecal coliform	Summer PCR
Chenoweth Run 5.25 to 9.2	Fecal coliform	Year Round SCR
Currys Fork 0.0 to 4.8	*E. coli*	Summer PCR
Floyds Fork 0.0 to 11.7	*E. coli*	Summer PCR
Floyds Fork 11.7 to 24.2	Fecal coliform	Summer PCR
Floyds Fork 24.2 to 34.1	*E. coli*	Summer PCR
Floyds Fork 34.1 to 61.9	*E. coli*	Summer PCR
Floyds Fork 34.1 to 61.9	Fecal coliform	Year Round SCR
Long Run 0.0 to 9.9	*E. coli*	Summer PCR
North Fork Currys Fork 0.0 to 6.0	*E. coli*	Summer PCR
Pennsylvania Run 0.0 to 3.3	*E. coli*	Summer PCR
Pennsylvania Run 0.0 to 3.3	Fecal coliform	Year Round SCR
Pope Lick 0.0 to 2.1	*E. coli*	Summer PCR
Pope Lick Creek 2.1 to 5.5	*E. coli*	Summer PCR
South Fork Currys Fork 0.0 to 6.1	*E. coli*	Summer PCR
South Long Run 0.0 to 3.35	*E. coli*	Summer PCR
UT of South Fork Currys Fork 0.0 to 1.8	*E. coli*	Summer PCR

Some stream segments are listed as polluted by both fecal coliform and *E. coli* bacteria, while others are not. This may be because only one bacteria type was collected from the stream’s water or only one type of bacteria was too high. Also, while all the listed stream segments are polluted for the summer PCR number, only some are polluted for the year round SCR number. In order to be polluted for the year round SCR number, fecal coliform samples must have been collected from the stream during the winter (Nov 1 through Apr 30). Finally, for many streams in the Floyds Fork watershed, no bacteria have been collected to see if they are too high. These streams are considered as "unassessed," which means it is not known if they are polluted by bacteria or not. These "unassessed" streams are not listed in this report.

The KDOW has calculated a TMDL for each of the steam segments listed in Table S.2. Because a TMDL is the amount of a pollutant allowed per day, KDOW had to determine the allowable daily load for the bacteria pollutant. To do this, KDOW had to change the legal limits in Table S.1 to a different form to calculate the bacteria TMDLs. The following pages tell how the TMDLs were calculated, how the allowable load was divided to different sources of bacteria in the watershed, and provide example calculations from one bacteria impaired stream segment.

Mathematical calculations were done to change the allowable amount of bacteria from a concentration (colonies of bacteria allowed per 100 ml of water) to a daily load (colonies of bacteria allowed per day). This is done by multiplying the allowable concentration of bacteria in Table S.1 by a stream flow (in cubic feet per second or cfs) and a conversion factor to change from colonies bacteria per 100 ml per cubic foot per second (cfs) to colonies bacteria per day. The conversion factor is figured as 1 cubic foot = 28,316.85 ml and 1 day = 86,400 seconds so the conversion factor is 24,465,758.4/day. The equation to calculate the TMDL is shown by Equation 1:

Equation 1:

TMDL (allowable colonies per day) = Allowable Concentration (colonies per 100 ml) x Flow (in cubic feet per second) x Conversion Factor (24,465,758.4/day)

The flow in this equation is called a "critical flow" and it is the flow of the stream when the water sample with the highest number of bacteria was collected. If flow was not measured in the stream, some way must be used to estimate what the flow was. In the Floyds Fork watershed, the United States Geological Survey (USGS) has several gages that measure flow in a stream. These gages may not be in the same place where the stream was sampled, but the flow measured by a gage can be used to estimate the flow at a nearby place. This is done by dividing the acres of land that drain to a sample site by the acres of land that drain to the gage site and multiplying by the flow at the gage. The equation for this is below:

Equation 2:

Flow at sample site (cfs) = Acres of land draining to sample site ÷ Acres of land draining to gage site x Flow at gage (cfs)

As an example, for South Fork Curry's Fork the highest *E. coli* bacteria of 22,000 per 100 ml was collected on 7/31/2008 at a site called SFCF-2. Flow was not measured in the stream so it must be estimated. The nearby USGS gage had a flow of 233 cfs on 7/31/2008. The amount of land draining to sample site SFCF-2 is 4,672 acres and the amount of land draining to the gage is 51,136 acres.

Flow at sample site = 4,672 acres ÷ 51,136 acres x 233 cfs

Flow at sample site = 21.3 cfs

So the estimated flow for the sample site SFCF-2 is 21.3 cfs on 7/31/2008 when the highest bacteria number was collected.

This estimated flow can now be used in Equation 1 to calculate the TMDL. South Fork Curry's Fork is polluted for summer (PCR) *E. coli* and the legal maximum number from Table S.1 is 240 colonies per 100 ml.

TMDL = 240 *E. coli* colonies per 100 ml x 21.3 cfs x 24,465,758.4/day

TMDL = 125,068,956,900 *E. coli* colonies per day

Because this is a very large number, another way to show the number is used in science; this form is called "scientific notation." In this form, the TMDL number above is shown as 1.25E+11. This means that there are really 11 numbers (E+11), but only two of them are shown. To get close to the real number, the decimal point should be moved 11 places to the right. A negative scientific notation number like 1.25E-3 means that the decimal point should be moved to the left three places and the real number is .00125. Scientific notation just helps to not have to write a lot of large numbers.

If the site where bacteria were collected is not at the downstream end of a stream segment, one last step is done to determine the stream segment TMDL. The TMDL number must be adjusted for increased flow at the downstream end of the stream segment. This is done by multiplying the site TMDL by the number of acres draining to the end of the stream segment and then dividing by the number of acres draining to the site as shown in Equation 3.

Equation 3:

Stream Segment TMDL = Site TMDL x Acres at downstream end of stream segment ÷ Acres at site

As an example for South Fork Curry's Fork, the acres of land draining to the downstream end at river mile 0.0 are 5,949 acres. From above, the acres of land draining to the site SFCF-2 are 4,672 acres and the site TMDL is 1.25E+11 *E. coli* colonies/day.

Segment TMDL = 1.25E+11 *E. coli* colonies per day x (5,949 acres ÷ 4,672 acres)

Segment TMDL = 1.25E+11 *E. coli* colonies per day x (1.27)

Segment TMDL = 1.59E+11 *E. coli* colonies per day

This is the final *E. coli* TMDL for the stream segment South Fork Curry's Fork 0.0 to 6.1.

All the bacteria TMDLs in Floyds Fork watershed were calculated the same way as outlined above. For each stream segment, the site with the highest bacteria count is used, the flow from this site is either estimated or used directly if it was measured, the bacteria limit is read from the chart (Table S.1), and the numbers are adjusted for differences in acres of land draining to the gage, the site, and the end of the stream segment.

Once the total allowable load for a stream segment (the segment TMDL) is figured, the allowable amount is split to different sources of bacteria in the watershed (i.e., split to sources that contribute bacteria to the downstream impaired stream segment). Also, part of the allowable load has to be "saved" and not given to any source to be on the safe side. This saved part is called a "Margin of Safety." One type of source of bacteria is those with a permit to release bacteria to water. The load that is split to this type of source is called a "Waste Load Allocation" or WLA for short. Permitted sources include things like facilities that treat human sewage and some city drainage systems that carry water and pollutants to the stream (called Municipal Separate Storm Sewer Systems, or MS4 for short). The second type of source includes those that discharge bacteria to a stream but are not required to have a permit to do so. The load that is split to these unpermitted sources is called a "Load Allocation" or LA for short. This type of source includes wildlife and other natural sources of bacteria, rural areas and most farms, among others. Although they do not have a permit, LA sources are still legal. Any source that is illegal is not given a split of the allowable load. Illegal sources include things like failing septic tanks, leaking sewer lines, and sanitary sewer overflows, among others. The equation used to explain the dividing of the load to sources is:

Equation 4:

TMDL = ∑WLA (sum of splits to permitted sources) + ∑LA (sum of splits to legal sources with no permit) + MOS (margin of safety)

The symbol "∑" means that things are added together or summed. This equation means that the TMDL is equal to the sum of all the Waste Load Allocations given to the permitted sources of bacteria plus the sum of all the Load Allocations given to the sources of bacteria that do not have a permit plus the Margin of Safety. This tells how the allowable load from the TMDL is split to the different sources of bacteria and to the Margin of Safety.

Because Equation 1 and Equation 4 both tell what a TMDL is, the equations can be used to learn something about TMDLs. From Equation 1: TMDL = Allowable Concentration x Flow x Conversion Factor and Equation 4: TMDL = ∑WLA + ∑LA + MOS, we can learn that:

Allowable Concentration x Flow x Conversion Factor = ∑WLA + ∑LA + MOS

Because the allowable concentration does not change (it is the legal number) and the conversion factor does not change (it is 24,465,758.4/day), we can learn that the flow changes what the allowable load is and that allocations are based upon the chosen flow. What this means is that there are many loads that will meet the allowable concentration of bacteria in the stream. As the flow increases the load also increases and the allowable allocations split to different sources also increase. However, it is required that one flow be chosen to determine one segment TMDL and this is called the “critical flow” as mentioned above.

We can see how the TMDL changes with flow by showing information on a graph. The graphs in this report are called “load duration curves.” Load duration curves do not determine a TMDL (Equations 1 through 3 tell how TMDLs are calculated), they just show load and flow information at one site on a stream segment. An example load duration curve is shown for South Fork Curry’s Fork at site SFCF-2 in Figure S.2, below.

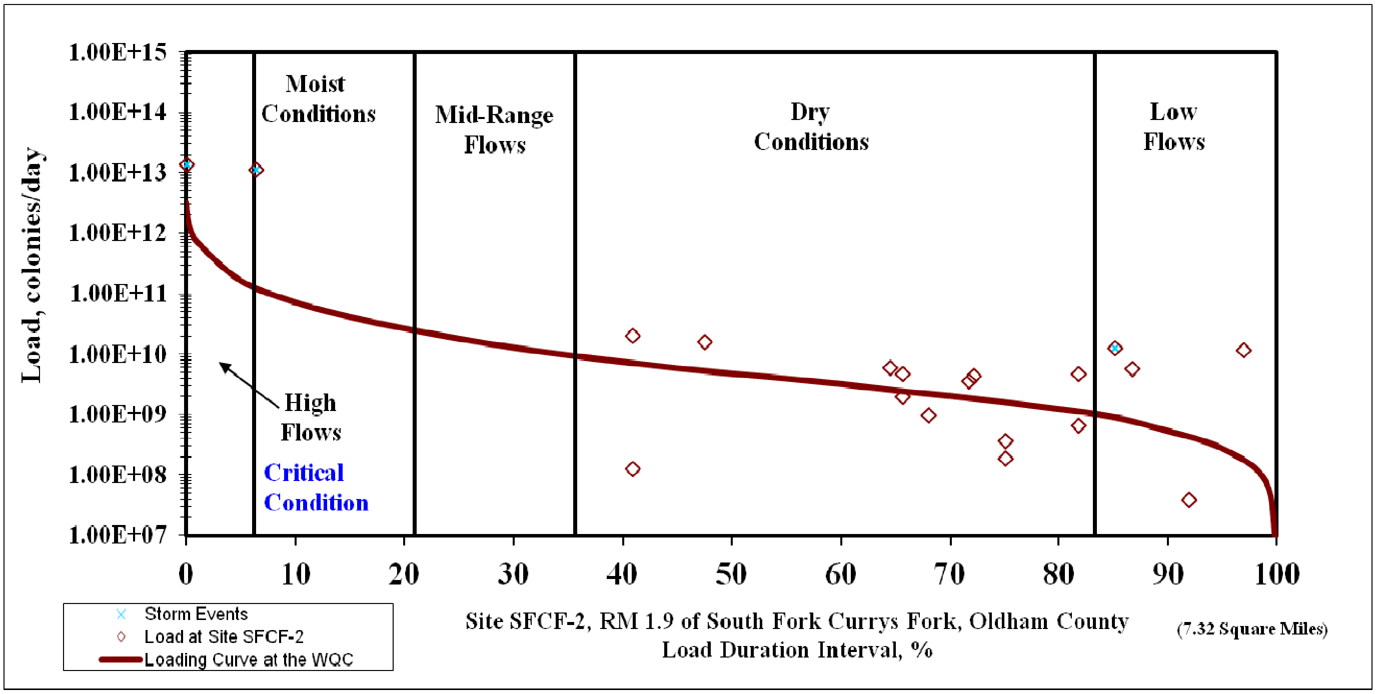

Figure S.2 Load Duration Curve for Site SFCF-2 on South Fork Curry’s Fork

On this graph, loads are plotted on the y axis and flow intervals are on the x axis. A flow interval is the percentage of time any flow in a stream is equaled or exceeded. For example, very low flows or droughts plot on the right side of the graph and have flows that are often exceeded (more than about 83% of the time on this graph). Very high flows or floods plot on the left side of the graph and have flows that are not often exceeded (only about 6 or 7% of the time on this graph). This figure shows several things. First, the red line shows the site TMDL. As mentioned above, as the flow increases, the allowable TMDL also increases. The site TMDL (red line) was calculated as explained for Equation 1 (TMDL = Allowable Concentration x Flow x Conversion Factor) using many different flows in the equation. Second, the bacteria samples collected are shown as a load (plotted as a “◊”) based upon the flow on the day a sample was collected. This is done using Equation 5.

Equation 5:

Sample Load = Sample Concentration x Flow (on sample day) x Conversion Factor

This is much the same as Equation 1 but, instead of using the legal limit, the actual sample concentration is used. This sample load is called the "existing load" for any given sample day. On the graph in Figure S.2, sample loads that are above the red TMDL line are loads that are above the legal limit. Sample loads below the red TMDL line are below the legal limit. Third, samples that were collected when much of the water in the stream was storm water are shown with a light blue x in the ◊ (after changing from concentration to load); there are three of these on this graph. Finally, the graph shows under what types of flows the loads tend to be greater than the TMDL line. The storm water samples all tend to be high on this graph, so we can guess that rain or storm water results in higher bacteria loads. If the sample load is above the TMDL line, the flow condition (high, moist, mid-range, dry, or low) can tell us something about what sources may be present. This is shown in Table S.3 (Table from EPA, 2007).

Table S.3 Sources Associated with Flow Zones

Contributing Source Area	Duration Curve Zone				
	High Flow	Moist	Mid-Range	Dry	Low Flow
Point Source				*M*	*H*
On-site wastewater systems			*H*	*M*	
Riparian Areas		*H*	*H*	*H*	
Storm water: Impervious Areas		*H*	*H*	*H*	
Combined sewer overflows	*H*	*H*	*H*		
Storm water: Upland	*H*	*H*	*M*		
Bank erosion	*H*	*M*			
Note: Potential relative importance of source area to contribute loads under given hydrologic condition *(H: High; M: Medium)*					

As mentioned above, once a TMDL is calculated, the allowable load must be split to different sources and to the Margin of Safety. The Margin of Safety (MOS) for the TMDLs in this report was set at 10% of the allowable load. This is shown in Equation 6.

Equation 6:

Margin of Safety = TMDL x 10%

As an example for South Fork Currys Fork 0.0 to 6.1, the Margin of Safety is:

MOS = (1.59E+11 *E. coli* colonies per day) x 10% = 1.59E+10 *E. coli* colonies per day

The TMDL Equation can now be written as:

TMDL –MOS (margin of safety) = ∑WLA (sum of splits to permitted sources) + ∑LA (sum of splits to sources with no permit)

Next, the split that goes to the facilities that have a permit (those that treat sewage) can be calculated. The word "facilities" includes an individual home, apartment units, schools, and others that treat their own sewage as well as treatment plants that collect and treat sewage from many different places. Because there are many types of WLAs, the KDOW calls the WLAs that go to a facility a "SWS-WLA", where SWS stands for "Sanitary Wastewater System." The individual SWS-WLA split given to each facility is calculated by Equation 7:

Equation 7:

SWS-WLA (sanitary wastewater facility split) = Allowable Concentration of Bacteria (colonies per 100 ml) x Facility Design Capacity (Design Flow in cfs) x Conversion Factor (24,465,758.4/day)

For these types of facilities, the allowable concentration of bacteria is determined by the summer limits in Table S.1. The facilities have to meet these summer limits throughout the year, including during the winter.

There may be no facilities or many in any given subwatershed of Floyd Fork. For South Fork Currys Fork, there are four permitted facilities. The maximum *E. coli* SWS-WLAs for the facilities in South Fork Currys Fork subwatershed are shown in Table S.4. The numbers in the rows were multiplied to figure the SWS-WLA. These were then added together to get the total SWS-WLA for the South Fork Currys Fork subwatershed.

Table S.4 *E. coli* SWS-WLAs for South Fork Currys Fork

Permit #	Facility Name	Maximum Allowable Limit for *E. coli* (colonies/100 ml)	Facility Design Capacity (cfs)	Conversion Factor (1/day)	SWS-WLA (*E. coli* colonies/day
KY0039870	Lakewood Valley	240	0.1547229	24,465,758.40	9.08E+08
KY0054674	Lockwood Estates Subdivision	240	0.069625305	24,465,758.40	4.09E+08
KY0076732	Centerfield Elementary	240	0.01547229	24,465,758.40	9.08E+07
KYG400289	Gibson Residence	240	0.000618892	24,465,758.40	3.63E+06
Total subwatershed SWS-WLA					1.41E+09

Because some of the allowable load has already been split to different sources and to the margin of safety, only some of the allowable load is left. The part that is left is called the "remainder" by the KDOW. This remainder is calculated as shown in Equation 8 where ∑SWS-WLA is the total of all the individual SWS-WLAs in the subwatershed.

Equation 8:

Remainder = TMDL – MOS (margin of safety) – ∑SWS-WLA (total of splits for sanitary wastewater sources)

For South Fork Currys Fork 0.0 to 6.1, the Remainder is calculated as:

Remainder = 1.59E+11 - 1.59E+10 – 1.41E+09

Remainder = 1.42E+11 *E. coli* (colonies/day)

Another split of the allowable load goes to the permitted MS4s in the subwatershed. These are also a split of the WLA and are called a "MS4-WLA" by the KDOW. The MS4-WLA is calculated based upon the remainder, the acres of land in the subwatershed and the acres of land that are within the MS4; excluding agricultural land or open water. The equation for this is shown in Equation 9.

Equation 9:

MS4-WLA = # Acres of MS4 area within Urbanized Boundary of MS4 ÷ # Acres in Subwatershed x Remainder

For South Fork Currys Fork 0.0 to 6.1, there are 1,980.63 acres of MS4 land in the MS4 boundary, 5,948.52 acres in the subwatershed, and the remainder is 1.42E+11 *E. coli* (colonies/day). The MS4-WLA for South Fork Currys Fork 0.0 to 6.1 is figured as:

MS4-WLA = 1,980.63 acres ÷ 5,948.52 acres x 1.42E+11 *E. coli* (colonies/day)

MS4-WLA = 4.72E+10 *E. coli* (colonies/day)

A third split of the WLA goes to "future growth" in the watershed. The KDOW calls this the "Future Growth-WLA" and it is a split that is saved for future permitted sources, including new facilities, increasing design capacity at current facilities, new storm water sources, and growth of existing storm water sources (such as MS4s).

The Future Growth-WLA is calculated based on a percentage of the remainder and is calculated as shown in Equation 10.

Equation 10:

Future Growth-WLA = Future Growth WLA Percentage x Remainder

The Future Growth WLA Percentage is based on the acres of developed land in the subwatershed divided by the acres of land in the subwatershed. Table S.5 shows what percentage of the remainder is used for the Future Growth-WLA.

Table S.5 Future Growth

Percent Developed Area in the Subwatershed	Future Growth WLA Percentage
≥25%	5%
≥20% – <25%	4%
≥15% – <20%	3%
≥10% – <15%	2%
≥5% – <10%	1%
<5%	0.5%

For the South Fork Currys Fork 0.0 to 6.1 subwatershed, there are 754 acres of developed land and 5,948.52 acres of land in the subwatershed. Dividing these gives a percent developed area of 12.68 (754 ÷ 5,948.52 = 12.68%). Because 12.68% is between 10 % and 15%, Table S.5 tells us to use 2% for the Future Growth WLA Percentage. The Future Growth-WLA for the South Fork Currys Fork subwatershed can now be calculated as:

Future Growth-WLA = 2% x 1.42E+11 *E. coli* (colonies/day)

Future Growth-WLA = 2.84E+09 *E. coli* (colonies/day)

These are all the steps to determine the split of the allowable load that goes to WLA sources. Next, the split that goes to the sources with no permit (the LA sources) is determined. This is calculated by rearranging the TMDL allocation equation (Equation 4) to that shown in Equation 11:

Equation 11:

∑LA (total of splits to sources with no permit) = TMDL – MOS (margin of safety) - ∑WLA (total of splits to permitted sources)

As an example for the South Fork Currys Fork subwatershed, the TMDL is 1.59E+11, the MOS is 1.59E+10, the SWS-WLA is 1.41E+09, the MS4-WLA is 4.72E+10, and the Future Growth-WLA is 2.84E+09. Adding all the different types of WLAs together to get ∑WLA gives us a ∑WLA of 5.15E+10 (1.41E+09 + 4.72E+10 + 2.84E+09 = 5.15E+10). Putting this into Equation 11 gives:

∑LA= 1.59E+11 – 1.59E+10 – 5.15E+10

∑LA= 9.81E+10

This is the final step to determine the allowable spilt to different sources in the watershed.

In this report, Sections 1 through 3 tell some general information about the Floyds Fork watershed. Section 4 tells about the bacteria sampling that has happened in the watershed with more information in Appendix B. Section 5 tells about the different sources that are or may be in the watershed. Section 6 tells the bacteria-limits and Section 7 tells how the TMDLs were calculated. Section 8 tells the information for each bacteria-polluted stream segment, gives the TMDL and allocations for it, and shows a load duration curve for each bacteria-impairment. Section 9 tells what some of the implementation options are in the Floyds Fork watershed, but does not give specific implementation details. Section 10 tells about public participation and Section 11 gives the references. The eleven equations above are all of the equations that go into determining the TMDLs and allocations in Section 8 of this report. Summary tables for each of the segment TMDLs calculated for the Floyds Fork watershed are shown in tables S.6 through S.8.

Table S.6 TMDLs for *E. coli* Summer PCR Impaired Segments

Waterbody Name	TMDL (colonies/ day)	MOS (colonies/ day)	SWS-WLA (colonies/ day)	Future Growth-WLA (colonies/ day)	MS4-WLA (colonies/ day)	LA (colonies/ day)
Asher Run 0.0 to 4.8	5.71E+10	5.71E+09	0	5.14E+08	2.30E+10	2.79E+10
Cane Run 0.0 to 7.3	4.67E+10	4.67E+09	4.54E+06	2.10E+08	2.20E+10	1.98E+10
Cedar Creek 4.3 to 11.1	1.44E+12	1.44E+11	6.83E+10	6.16E+10	8.64E+11	3.06E+11
Chenoweth Run 0.0 to 5.25	2.43E+12	2.43E+11	3.86E+10	1.07E+11	1.75E+12	2.92E+11
Chenoweth Run 5.25 to 9.2	4.09E+11	4.09E+10	3.63E+10	1.66E+10	3.04E+11	1.09E+10
Currys Fork 0.0 to 4.8	4.91E+11	4.91E+10	2.05E+10	1.27E+10	1.96E+11	2.13E+11
Floyds Fork 0.0 to 11.7	4.33E+13	4.33E+12	2.21E+11	1.16E+12	1.85E+13	1.92E+13
Floyds Fork 24.2 to 34.1	2.00E+13	2.00E+12	8.82E+10	3.59E+11	7.00E+12	1.06E+13
Floyds Fork 34.1 to 61.9	1.74E+13	1.74E+12	8.81E+10	3.12E+11	5.22E+12	1.01E+13
Long Run 0.0 to 10.0	5.52E+10	5.52E+09	8.18E+06	2.48E+08	1.28E+10	3.66E+10
North Fork Currys Fork 0.0 to 6.0	1.78E+11	1.78E+10	1.85E+10	5.67E+09	7.58E+10	6.02E+10
Pennsylvania Run 0.0 to 3.3	8.20E+09	8.20E+08	1.87E+09	2.76E+08	4.30E+09	9.42E+08
Pope Lick Creek 0.0 to 2.1	3.18E+11	3.18E+10	3.63E+07	1.43E+10	2.24E+11	4.77E+10
Pope Lick Creek 2.1 to 5.5	5.36E+11	5.36E+10	1.82E+07	2.41E+10	3.66E+11	9.30E+10
South Fork Currys Fork 0.0 to 6.1	1.59E+11	1.59E+10	1.41E+09	2.84E+09	4.72E+10	9.18E+10
South Long Run 0.0 to 3.35	2.63E+09	2.63E+08	0	2.37E+07	4.78E+08	1.87E+09
UT to South Fork Currys Fork 0.0 to 1.8	1.18E+11	1.18E+10	9.08E+08	1.05E+09	5.38E+09	9.89E+10

Table S.7 TMDLs for Fecal Coliform Summer PCR Impaired Segments

Waterbody Name	TMDL (colonies/day)	MOS (colonies/day)	SWS-WLA (colonies/day)	Future Growth-WLA (colonies/day)	MS4-WLA (colonies/day)	LA (colonies/day)
Asher Run 0.0 to 4.8	2.41E+09	2.41E+08	0	2.17E+07	9.69E+08	1.18E+09
Cedar Creek 4.3 to 11.1	2.23E+11	2.23E+10	1.14E+11	4.35E+09	6.10E+10	2.17E+10
Chenoweth Run 0.0 to 5.25	6.34E+11	6.34E+10	6.43E+10	2.53E+10	4.12E+11	6.89E+10
Chenoweth Run 5.25 to 9.2	1.41E+12	1.41E+11	6.06E+10	6.06E+10	1.11E+12	3.96E+10
Floyds Fork 11.7 to 24.2(1)	1.16E+13	1.16E+12	2.13E+11	2.05E+11	4.57E+12	5.49E+12

Note: (1)Due to an administrative error, the pollutant was listed as E. coli on the 2012 Integrated Report. This will be corrected to fecal coliform on the 2014 Integrated Report. A TMDL was calculated for the correct pollutant, fecal coliform.

Table S.8 TMDLs for Fecal Coliform Year Round SCR Impaired Segments

Waterbody Name	TMDL (colonies/day)	MOS (colonies/day)	SWS-WLA (colonies/day)	Future Growth-WLA (colonies/day)	MS4-WLA (colonies/day)	LA (colonies/day)
Chenoweth Run 0.0 to 5.25	3.17E+12	3.17E+11	6.43E+10	1.39E+11	2.27E+12	3.79E+11
Chenoweth Run 5.25 to 9.2	7.07E+12	7.07E+11	6.06E+10	3.15E+11	5.78E+12	2.06E+11
Floyds Fork 34.1 to 61.9	1.46E+12	1.46E+11	1.47E+11	2.34E+10	3.91E+11	7.55E+11
Pennsylvania Run 0.0 to 3.3	9.20E+12	9.20E+11	3.12E+09	4.14E+11	6.45E+12	1.41E+12