

2016 Triennial Review of Water Quality Standards  
Issue in Review: Proposed Removal of 19 Tier II waters  
from the Code of Maryland Regulations 26.08.02.04-1



**Maryland**  
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the Environment

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## Table of Contents

Statement of Purpose .....	3
Background Information .....	3
History .....	3
How these Changes to the List of Tier II Waters were Implemented .....	4
The 19 Streams Removed from the Tier II List in COMAR 26.08.02.04-1 O. ....	5
Tier II Segment Proposed for Deletion: Aydellotte Branch 1.....	10
Tier II Segment Proposed for Deletion: Bens Run (aka Dogwood Run).....	13
Tier II Segment Proposed for Deletion: Choptank River UT 2.....	15
Tier II Segment Proposed for Deletion: Deer Creek 1.....	17
Tier II Segment Proposed for Deletion: Fifteenmile Creek 2 .....	19
Tier II Segment Proposed for Deletion: Indian Run 1 .....	22
Tier II Segment Proposed for Deletion: Lyons Creek 2 .....	24
Tier II Segment Proposed for Deletion: Mudlick Hollow 1 .....	26
Tier II Segment Proposed for Deletion: Murley Branch 1 .....	29
Tier II Segment Proposed for Deletion: North Branch Patapsco River 2 .....	31
Tier II Segment Proposed for Deletion: Persimmon Creek 1 .....	33
Tier II Segment Proposed for Deletion: Saint Marys River UT 1 .....	35
Tier II Segment Proposed for Deletion: Saint Marys River UT 2 .....	37
Tier II Segment Proposed for Deletion: Savage River 3 .....	39
Tier II Segment Proposed for Deletion: Town Creek 2 .....	41
Tier II Segment Proposed for Deletion: Western Run 1 .....	43
Tier II Segment Proposed for Name Change: Browns Branch 1 .....	45
Tier II Segment Proposed for Name Change: Browns Branch 2 .....	47
Tier II Segment Proposed for Name Change: Southeast Creek UT 1 .....	49

## Statement of Purpose

This document was developed to help capture and memorialize the Department's justification for removing nineteen Tier II high quality water segments from Code of Maryland Regulations (COMAR) 26.08.02.04-1 during the 2016 Triennial Review of Water Quality Standards.

## Background Information

During the 2016 Triennial Review of Water Quality Standards (public review started in May 2017 with the public comment period extending to July 10, 2017), MDE staff became inundated with questions surrounding the proposed removal of 19 Tier II segments from COMAR 26.08.02.04-1. The reasons for removal were varied and sometimes complex. As a result, this document was developed to help characterize and consolidate the justification behind each of these Tier II segment removals with particular detail given for those segments that had more complex reasons for removal. This document should be saved in any location where information on the 2016 Triennial Review of Water Quality Standards is stored and in any location where information on Tier II waters designation is stored.

## History

Around 2011/2012 MDE began conducting more rigorous quality control checks on the Tier II designation process and the DNR Maryland Biological Stream Survey (MBSS) data used to identify and designate streams as Tier II high quality. At the time, MDE assessors noticed several types of errors that affected roughly 7% of the Tier II streams. One type of error that MDE assessors noted was that some of the coordinates associated with MBSS sites had the sample sites plotted near incorrect stream segments. As a result, MDE added a new step to its protocols for designating Tier II streams which involved consulting with DNR MANTA staff to determine the proper location of each MBSS site that was potentially part of a Tier II designation. If, in the rare case, DNR staff was unable to positively confirm the location of an MBSS site, MDE would not use that data to assign a Tier II designation. Another type of error noted was that some Index of Biotic Integrity (IBI) scores had changed between different versions of the MBSS database (MDE receives a new copy of the MBSS database every year).

Specifically, DNR and MDE were using a spreadsheet, named “MBSSMergedR1R2\_08Nov2005.xls”, which had a number of BIBIs incorrectly calculated. MDE consulted with DNR MANTA on the IBI score changes to determine the cause and proper score that should be assigned. As a result, MDE now also runs cross database queries and independent IBI calculations to ensure that the IBI scores for sites are consistent with each updated database. Other errors discovered during the new more rigorous quality control checks included errors by the MDE assessors in naming certain Tier II segments, and errors in data omission (i.e. not including IBI scores that should have been included in the baseline Tier II assessment). These more complex errors will be described in more detail in the following sections of this document.

All of the errors were roughly discovered around the 2011-2012 timeframe with a spreadsheet created to inform the 2013 Triennial Review of Water Quality Standards (TR). It was planned that these segments would be proposed for removal on the 2013 TR along with some additions to the list of Tier II waters. However, a gap in communication occurred and the ANPRM and Notice of Proposed Action for the 2013 TR only included the new Tier II segments proposed for addition and did not propose or discuss the proposed Tier II removals. As a result, no public review occurred for these 19 proposed removals and these segments remained, erroneously, in COMAR 26.08.02.04-1. During this time (2012-2013) all publicly-available online maps, GIS files, and internal MS Excel spreadsheets were updated to reflect both the new Tier II segments added in the 2013 TR and also had the 19 erroneous Tier II segments removed. The 2013 TR’s omission of mentioning the removal of 19 Tier II segments was only realized later after Water Quality Standards staff were contacted by Water Management Administration permitting staff.

## **How these Changes to the List of Tier II Waters were Implemented**

Since these 19 Tier II designations were known errors, the Department was compelled to correct the online Tier II high quality waters map consistent with the language in Code of Maryland Regulations 26.08.02.04-1 that requires the compilation and maintenance of a public list of Tier II waters. As a result, the Department implemented the Tier II antidegradation regulations according to the correct list of Tier II segments and not the list contained in COMAR 26.08.02.04-1. Since all of the 19 Tier II segments proposed for removal involved changes to their baseline Tier II assessment (i.e. IBI miscalculations, geographic errors, etc), the Department did not feel that it could justify treating them as Tier II waters under antidegradation policy when the agency had data to show that they were not, in fact, deserving of a Tier II designation. So, MDE Water Quality Standards (WQS) staff implemented the

antidegradation review program without consideration of these 19 segments as Tier II high quality waters. Likewise, during the intervening time period between the 2013 and 2016 Triennial Review periods, WQS staff treated all newly and properly identified Tier II waters (on the basis of recently sampled MBSS data) as Tier II despite not yet being included in the Code of Maryland Regulations (COMAR) 26.08.02.04-1 O. Thus, the Department has used the public list of Tier II waters consistently in how it has handled both removals and additions to the list of Tier II waters.

It is worth noting that the circumstances under which these 19 streams were proposed for removal from COMAR 26.08.02.04-1 O. was unusual because it did not involve any type of permitted water quality degradation like that described in Code of Maryland Regulations 26.08.02.04. If the circumstances for removing these stream segments from the Tier II list had instead involved a permitted degradation, such as permit issuance where an anticipated impact was likely, the Department would have required a social and economic justification. Instead, since these stream removals were merely errors in the initial Tier II evaluation, the Department felt that removing them from the list of Tier II waters was well justified.

After learning that the removal of these 19 streams never occurred during the 2013 Triennial Review (TR), Water Quality Standards (WQS) staff kept more detailed records to ensure that these changes were discussed and highlighted in the 2016 TR. On May 15, 2017 WQS staff sent an email blast to individuals and groups on SSA's interested stakeholders list (which had approximately 500 recipients) providing information about these removals and other proposed changes to water quality standards. And on May 26, 2017 the Maryland Register detailed these changes and provided notice of the beginning of the public comment period.

### **The 19 Streams Removed from the Tier II List in COMAR 26.08.02.04-1 O.**

The following table (Table 1) provides a quick summary of the rationale for removing each of the 19 stream segments from the Tier II list in COMAR 26.08.02.04-1 O. For more detailed descriptions of the data and documentation used for removing these segments please read the sections after Table 1.

Table 1: Tabular summary of the rationale behind the removal of 19 stream segments from the Tier II list in COMAR 26.08.02.04-1 O.

Tier II Stream Name	County	From Lat	From Long	To Lat	To Long	Reason for Proposed Removal	Summary of Rationale for Removal
Aydelotte Branch 1	Wicomico	38.413950	-75.446520	38.405760	-75.381330	Data omission and IBI correction	Data (from station UPPC-114-R-2001) was incorrectly omitted from the original baseline assessment based on previous IBI score. When properly included with other baseline data from UPPC-107-R-2001, the average BIBI does not meet Tier II threshold of 4.00.
Bens Run 1 (also sometimes referred to as Dogwood Run)	Baltimore	39.316820	-76.792790	39.314020	-76.794000	Data omission – average does not meet threshold	Data (low BIBI from PATL-209-X-2010) was incorrectly omitted from original assessment. When included with other baseline data from PATL-209-X-2009, PATL-209-X-2010, and PATL-209-X-2011, the average BIBI for this segment does not meet T2 threshold of 4.00.
Choptank River UT 2	Caroline	38.884500	-75.876400	38.872180	-75.859880	Locational Issue	After additional review, the location of station UPCK-132-R-2000 could not be confirmed. Could be on 3 different stream segments. Follow-up sampling visit is planned for 2018.
Deer Creek 1	Baltimore	39.722890	-76.611750	39.707300	-76.590210	Locational Issue	Baseline sampling station BA-P-320-304-97 was originally plotted on an incorrect segment (i.e. Deer Creek 1). It was properly moved to the correct stream segment (it was sampled on Harris Mill Creek). The Deer Creek 1 name is proposed to be retired. This results in no net change in the number of T2 segments. Harris Mill Creek 1 is now in COMAR as Tier II.

<b>Tier II Stream Name</b>	<b>County</b>	<b>From Lat</b>	<b>From Long</b>	<b>To Lat</b>	<b>To Long</b>	<b>Reason for Proposed Removal</b>	<b>Summary of Rationale for Removal</b>
Fifteenmile Creek 2	Allegany	39.674630	-78.457770	39.692930	-78.451280	Corrected IBIs	Mathematical error in IBI calculation was discovered which lowered the benthic IBI scores for two different sampling events used for baseline Tier II evaluation. The corrected BIBIs cause the average BIBI score to be below the Tier II threshold (4.00).
Indian Run 1	Baltimore	39.548210	-76.742640	39.542300	-76.733840	Corrected IBI	Mathematical error in IBI calculation discovered. Corrected BIBI is below the Tier II threshold (4.00).
Lyons Creek 2	Anne Arundel, Calvert	38.764740	-76.659030	38.764980	-76.653340	Locational Issue	Baseline station CA-S-197-302-97 moved to the correct segment on Lyons Creek and thus the "Lyons Creek 2" name was retired. The new segment name is Lyons Creek 3. This did not result in a net change in the number of T2 segments.
Mudlick Hollow 1	Allegany	39.695900	-78.392920	39.656110	-78.400110	Data omission and IBI correction	Data from station AL-A-419-106-95 was incorrectly omitted from the original baseline assessment based on previous IBI score. When properly included with other baseline data from AL-A-524-211-95, the average BIBI does not meet T2 threshold of 4.00.
Murley Branch 1	Allegany	39.663980	-78.617680	39.663400	-78.611510	Corrected IBI	Mathematical error in IBI calculation discovered. Corrected BIBI is below the Tier II threshold (4.00).

<b>Tier II Stream Name</b>	<b>County</b>	<b>From Lat</b>	<b>From Long</b>	<b>To Lat</b>	<b>To Long</b>	<b>Reason for Proposed Removal</b>	<b>Summary of Rationale for Removal</b>
North Branch Patapsco River 2	Carroll	39.525790	-76.877900	39.522450	-76.875270	Locational Issue	Baseline station CR-P-409-320-96 was plotted on the incorrect segment (on North Branch Patapsco River downstream of confluence with Deep Run). When applied to the correct segment which is the North Branch Patapsco River upstream of Deep Run confluence, it's IBI scores must be averaged with CR-P-077-309-95. When averaged with this other station, this segment (the North Branch Patapsco River segment upstream of the confluence with Deep Run) does not meet the T2 threshold of 4.00.
Persimmon Creek 1	Saint Mary's	38.421500	-76.713050	38.440770	-76.696960	Corrected IBI	Mathematical error in IBI calculation discovered. Corrected BIBI is below the Tier II threshold (4.00).
Saint Marys River UT 1	Saint Mary's	38.214870	-76.430630	38.211550	-76.451410	Corrected IBI	Mathematical error in IBI calculation discovered. Corrected BIBI is below the Tier II threshold (4.00).
Saint Marys River UT 2	Saint Mary's	38.210650	-76.403080	38.197600	-76.419210	Name Change	Mathematical error in IBI calculation discovered. Reassessment showed that it still met Tier II threshold. However, it was renamed to Fisherman Creek 1 to reflect actual stream name.
Savage River 3	Garrett	39.501010	-79.106570	39.486430	-79.082790	Corrected IBI	Mathematical error in IBI calculation discovered. Corrected BIBI is below the Tier II threshold (4.00).
Town Creek 2	Allegany	39.693880	-78.547520	39.713060	-78.536430	Corrected IBI	Mathematical error in IBI calculation discovered. Corrected BIBI is below the Tier II threshold (4.00).
Western Run 1	Baltimore	39.527390	-76.722170	39.515030	-76.740600	Corrected IBI	Mathematical error in IBI calculation discovered. Corrected BIBI is below the Tier II threshold (4.00).

<b>Tier II Stream Name</b>	<b>County</b>	<b>From Lat</b>	<b>From Long</b>	<b>To Lat</b>	<b>To Long</b>	<b>Reason for Proposed Removal</b>	<b>Summary of Rationale for Removal</b>
Browns Branch 1	Queen Anne's	39.117590	-75.956460	39.116500	-75.965620	Name Change	This stream segment is improperly named as Browns Branch and instead should be named Southeast Creek UT 2. The Triennial Review proposes to remove the incorrect name (i.e. Browns Branch 1) and replace with Southeast Creek UT 2. This does not result in any net loss of Tier II designation.
Browns Branch 2	Queen Anne's	39.116510	-75.965630	39.130350	-75.977880	Name Change	This stream segment is improperly named as Browns Branch and instead should be named Southeast Creek UT 3. The Triennial Review proposes to remove the incorrect name (i.e. Browns Branch 2) and replace it with Southeast Creek UT 3. This does not result in any net loss of Tier II designation.
Southeast Creek UT 1	Queen Anne's	39.159680	-75.920760	39.163600	-75.951770	Name Change	This stream segment is improperly named as Southeast Creek UT 1 and instead should be named Browns Branch 3. The Triennial Review proposes to remove the incorrect name (i.e. Southeast Creek UT 1) and replace it with Browns Branch 3. This does not result in any net loss of Tier II designation.

## Tier II Segment Proposed for Deletion: Aydellotte Branch 1

Table 2: Tier II stream as shown in COMAR 26.08.02.04-1 on 6/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Aydellotte Branch 1	Wicomico	021302030653	38.41395	-75.44652	38.40576	-75.38133	4.67	4.14



Figure 1: Location Map for Tier II water proposed for removal, Aydellotte Branch 1. At the time this segment was originally designated, MBSS station UPPC-114-R-2001 was excluded from the assessment since it had a poor BIBI score and demonstrated blackwater characteristics.

Table 3: Sole MBSS data used in original Tier II designation after excluding the data from UPPC-114-R-2001.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
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UPPC-107-R-2001	AYDYLOTTE BRANCH	82647.4	538437.5	38.40038	75.41509	4.142857	4.666667
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Tables 4: MBSS station data that was initially excluded from the Tier II assessment because of a low BIBI score. Later, this score was revised after the IBIs were revised in 2005. Table 4 shows the water chemistry characteristics of UPPC-144-R-2001.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	BIBI_98	bibi_05	FIBI_05
UPPC-114-R-2001	AYDYLOTTE BRANCH	82683.5	537975.3	38.40078	75.42037	2.43	3	4

Table 5: This table shows the water chemistry characteristics of UPPC-144-R-2001.

SITEYR	DOC_LAB	ANC_LAB	PH_FLD	PH_LAB
UPPC-114-R-2001	10.8	181.5	6.89	6.54

### History of the Original Tier II Designation

This water was designated as Tier II in 2007 solely using the IBI scores from MBSS station UPPC-107-R-2001. At the time, staff disregarded the IBI scores from station UPPC-114-R-2001 since it exhibited blackwater conditions and it had a low BIBI score (2.43 based on an earlier IBI system). Blackwater stream conditions are one such vetting or data exclusion rule that MDE uses to exclude data that is not representative of local stream conditions. The biological assessment methodology states that when blackwater conditions are present in a stream (dissolved organic carbon >8mg/l and either pH <5 or acid neutralizing capacity (ANC) <200 ueq/L), the IBIs tend to underrate stream conditions. The reason for this is that there is a lack of defined blackwater reference conditions in Maryland. Thus when IBI scores are low and blackwater conditions are exhibited, the Department removes that data from assessment consideration. By itself, UPPC-107-R-2001 met the Tier II threshold and therefore Aydelotte Branch was designated as Tier II.

### Justification for Tier II Removal

Some time later, Tier II assessors realized that the IBI system changed the BIBI for UPPC-114-R-2001 to a 3.00. As a result, assessors determined that the data for UPPC-114-R-2001 should not be excluded from the baseline Tier II assessment. When averaged with UPPC-107-R-2001, the average BIBI is 3.57, below the Tier II designation threshold.

In 2015, MBSS repeated sampling at the UPPC-114 site obtaining the following IBIs from that sampling event. Conditions at this site did not meet the blackwater vetting rules. Even incorporating these scores leaves the final average BIBI below the Tier II threshold.

Table 6: MBSS station data from station that was sampled in 2015.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
UPPC-114-R-2015	AYDYLOTTE BRANCH	82720.49	537999.9	38.40111	75.42008	3.285714	4.333333

## Tier II Segment Proposed for Deletion: Bens Run (aka Dogwood Run)

Table 7: Tier II stream as shown in COMAR 26.08.02.04-1 on 6/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2012	Bens Run 1	Baltimore	21309061018	39.31682	-76.79279	39.31402	-76.79400	4.44	4



Figure 2: Location Map for Bens/Dogwood Run showing the location of MBSS sites.

Please note that the segment referred to as Bens Run is also called Dogwood Run depending on the mapping source. Regardless, MDE uses the geographic coordinates to identify the specific waters affected by the proposed action to delete this segment from the list of Tier II segments in COMAR 26.08.02.04-1.

### History of the Designation and Justification for Removal

This water was designated as Tier II after the 2011 sampling season by averaging the BIBI scores from 2009, 2010, and 2011 and using the single BIBI score of 4.00 from 2011. At the time, staff were unaware that a BIBI existed for the 2010 sampling event so this segment was designated as Tier II (in COMAR) with a designation date of 2012. In November of 2012 staff became aware of the 2010 BIBI score of a 1.57. It was unclear why this data (the BIBI of 1.57) should not be used so, in the interest of consistency, MDE included it in the Tier II baseline calculation. Averaging this score with the 2011 BIBI score of 4.00 led to an average BIBI of 2.79 (keeping the baseline evaluation year of 2011). As a result, it was determined that this water should not be designated as Tier II since the average of the two BIBI scores from 2010 and 2011 was below 4.00 and therefore did not meet the Tier II threshold.

Subsequent sampling by DNR (done for the purpose of another study) also indicated that BIBI scores were not at 4.00 or above. See table below.

**Table 8: Table showing all BIBI and FIBI scores for Bens/Dogwood Run. The BIBI value found after designation is indicated in the yellow cell.**

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
PATL-209-X-2009	DOGWOOD RUN	183029.293	417853.15	39.3153	76.79298		4.333333
PATL-209-X-2010	DOGWOOD RUN	183029.293	417853.15	39.3153	76.79298	1.57	4.666667
PATL-209-X-2011	DOGWOOD RUN	183029.293	417853.15	39.3153	76.79298	4	4.333333

**Table 9: Additional sampling that has occurred on Dogwood Run in years after Tier II designation.**

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
PATL-209-X-2012	DOGWOOD RUN	183029.3	417853.2	39.3153	76.79298	3.333333	4.666667
PATL-209-X-2013	DOGWOOD RUN	183029.3	417853.2	39.3153	76.79298	3.666667	4
PATL-209-X-2014	DOGWOOD RUN	183029.3	417853.2	39.3153	76.79298	2.333333	4
PATL-209-X-2015	DOGWOOD RUN	183029.3	417853.2	39.3153	76.79298	2.333333	4.333333
PATL-209-X-2016	Dogwood Run	183029.3	417853.2	39.3153	76.79298	3.333333	4.333333

## Tier II Segment Proposed for Deletion: Choptank River UT 2

Table 10: Tier II stream as shown in COMAR 26.08.02.04-1 on 6/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Choptank River UT 2	Caroline	021304040487	38.88450	-75.87640	38.87218	-75.85988	4.33	4.14

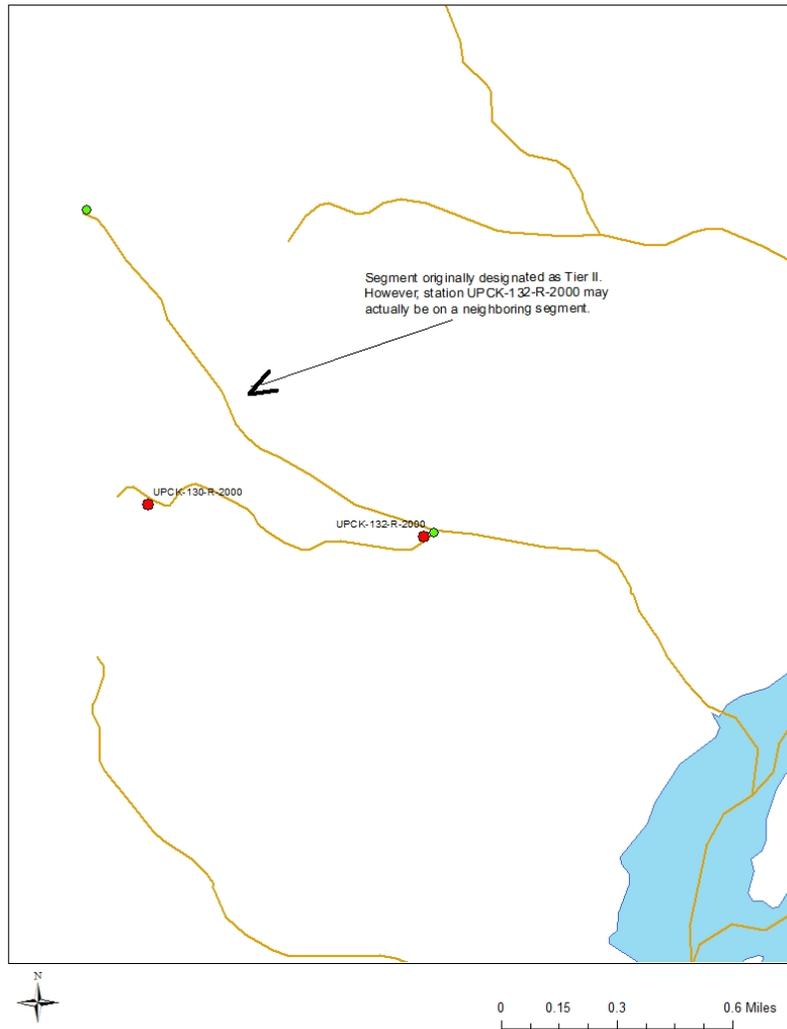


Figure 3: Location Map for Tier II water proposed for removal, Choptank River UT 2. MBSS station UPCK-132-R-2000 was originally thought to be sampled on the segment bounded by light green dots. However after conferring with DNR, it could not be determined which segment it was sampled within.

Table 11: Sole MBSS data used in original Tier II designation on the first order segment to the north.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
UPCK-132-R-2000	CHOPTANK RIVER UT1 UT2	134421.7	498889.4	38.87207	-75.8604	4.142857	4.333333

Table 12: IBI scores for the MBSS station on the first order stream to the south.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
UPCK-130-R-2000	CHOPTANK RIVER UT1 UT2	134555	497742.4	38.8734	75.8736	2.428571	1*

*\*This score would be removed from consideration since this station has a less than 300 acre catchment (89 acres).*

### History of the Original Tier II Designation and Justification for Tier II Removal

At the time this water was designated as Tier II in 2007, state assessors believed that the MBSS station UPCK-132-R-2000 was located on the first order stream to the north (for context please see map above) for which it was the only station sampled. However, after an extensive QAQC effort and consulting with DNR staff, assessors later could not confirm which stream segment this station assessed. If this MBSS station (UPCK-132-R-2000) was located on the segment to the south, the BIBI score would have to be averaged with the BIBI score from UPCK-130-R-2000, and as a result, would fail to achieve the Tier II threshold of 4.00. Since accurate locational information is imperative for identifying Tier II waters, state assessors felt it necessary to remove the Tier II designation until the location of the earlier sampling could be confirmed or followup sampling could be conducted.

## Tier II Segment Proposed for Deletion: Deer Creek 1

Table 2: Tier II stream as shown in COMAR 26.08.02.04-1 on 8/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Deer Creek 1	Baltimore Co.	021202020332	39.72289	-76.61175	39.70730	-76.59021	4.67	4.00

Figure 4: Location map for Tier II stream proposed for removal (Deer Creek 1 indicated by the thick blue line), and new addition (Harris Mill Creek 1 indicated by the red line between the two light green dots). Please note that the basemap, licensed from ADC Maps, incorrectly labels the stream in red as “Little Deer Creek” when the proper name is Harris Mill Creek.

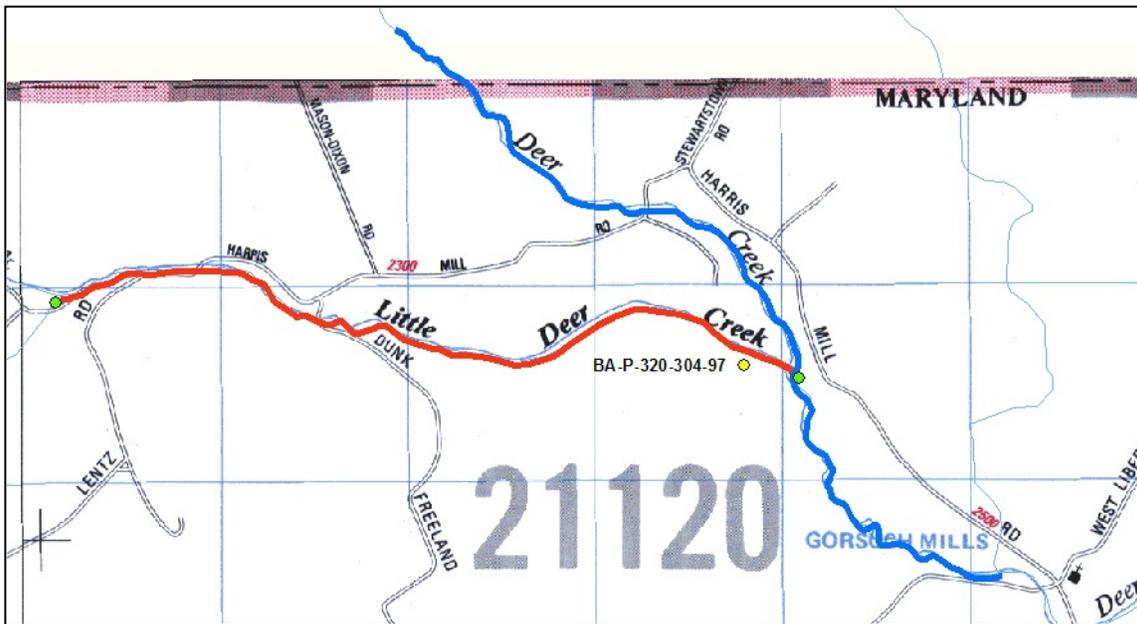


Table 13: MBSS data used in original Tier II designation.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
BA-P-320-304-97	HARRIS MILL CREEK	227277.2	434352.2	39.71333683	76.59941207	4.00	4.67

### History of the Original Tier II Designation

This stream segment was designated as Tier II in 2007 solely using the IBI scores from MBSS station BA-P-320-304-97. At the time, staff thought that this station was sampled on Deer Creek as indicated by the thick blue line in the above map. Since it was the only sample available at the time of assessment, the two IBI scores were enough to designate as Tier II.

### Justification for Tier II Removal

However, after conferring with DNR staff, the location of baseline sampling station BA-P- 320-304-97 was later corrected to be on a part of Harris Mill Creek, indicated by the red line located between the two light green dots in the map above. MDE staff reassessed this data for meeting the Tier II threshold. As there was no additional MBSS data on the stream segment, the assessors determined that the stream segment met the minimum Tier II designation threshold of 4.00 for both fish and benthos. The new Tier II stream designation is Harris Mill Creek 1. In light of the location correction, there is no MBSS data available for the Tier II segment Deer Creek 1. Therefore, MDE is removing Deer Creek 1 from the list of designated waters currently in COMAR 26.08.02.04-1. This change results in no net change in the total number of designated Tier II stream segments.

## Tier II Segment Proposed for Deletion: Fifteenmile Creek 2

Table 34: Tier II stream as shown in COMAR 26.08.02.04-1 on 6/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Fifteenmile Creek 2	Allegany	021405110137	39.69293	-78.45128	39.67463	-78.45777	4.67	4.00

Table 45: MBSS data used in original Tier II designation. Please note the highlighted BIBI scores. These scores were lowered after the BIBI calculation error was corrected. (The scores highlight in yellow are the original incorrect scores.)

SITEYR	BIBI_05	FIBI_05	ACREAGE	LAT	LONG
AL-A-146-301-95	4.00	4.33	12932.74	39.6916890	-78.4523000
AL-A-207-307-95	4.00	3.67	13170.94	39.6867110	-78.4557110
FIMI-207-S-2000	3.75	5.00	13345.90	39.6867145	-78.4557116
FIMI-207-S-2001	3.75	5.00	13345.90	39.6867145	-78.4557116
FIMI-207-S-2002	4.00	5.00	13345.90	39.6867145	-78.4557116
FIMI-207-S-2003	4.50	5.00	13345.90	39.6867145	-78.4557116
FIMI-207-S-2004	4.00	4.67	13345.90	39.6867145	-78.4557116
Arithmetic Mean	4.00	4.67			

Table 56: This table shows the recalculation of the baseline IBIs for this water segment after the BIBI's were correctly calculated. The revised BIBI scores are highlighted in green. After correction, the arithmetic mean BIBI does not meet the Tier II threshold of 4.00.

SITEYR	BIBI_05	FIBI_05	ACREAGE	Latitude83	Longitude8
AL-A-146-301-95	4.00	4.33	12932.74	39.691782	78.452035
AL-A-207-307-95	4.00	3.67	13170.94	39.686804	78.455448
FIMI-207-S-2000	3.75	5.00	13345.9	39.686715	78.455712
FIMI-207-S-2001	3.75	5.00	13345.9	39.686715	78.455712
FIMI-207-S-2002	3.75	5.00	13345.9	39.686715	78.455712
FIMI-207-S-2003	4.25	5.00	13345.9	39.686715	78.455712
FIMI-207-S-2004	4.00	4.67	13345.9	39.686715	78.455712
Arithmetic Mean	3.93	4.67			

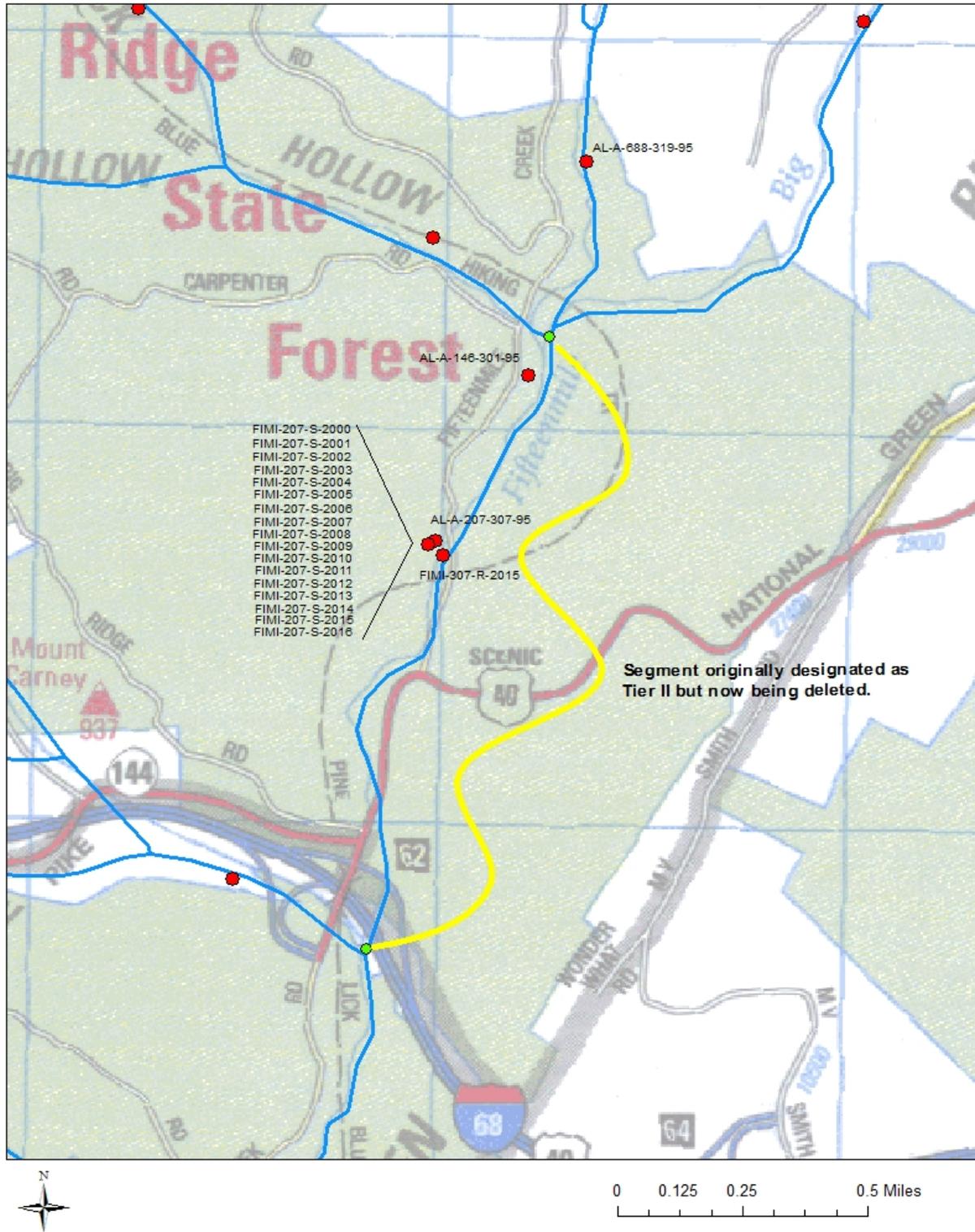


Figure 5: Location Map for Tier II water proposed for removal, Fifteenmile Creek 2 (indicated by the curved yellow line). At the time this segment was originally designated, only the scores for stations sampled prior to 2005 were available.

## History of the Original Tier II Designation and Justification for Tier II Removal

This water was designated as Tier II in 2007 using the IBI scores obtained from MBSS stations sampled prior to 2005 (Table 2). In the case of Fifteenmile Creek 2, the BIBI score from the sentinel site “FIMI-207-S-...” was incorrectly calculated for the 2002 and 2003 sampling years (See tables above). This led to an inflated average BIBI score for this stream segment. (Please note that MDE independently averages the BIBI and FIBI scores obtained from the same stream segment.) After this mistake was discovered, the resulting BIBI scores decreased and caused the overall stream segment BIBI average to be below the Tier II designation threshold of 4.00. As a consequence, this segment had to be removed from the list of Tier II waters.

Subsequent sampling at this MBSS sentinel site (FIMI-207-S-XXXX) since 2005 has shown a number of BIBI scores below the Tier II threshold (4.00). Taking the average of these scores also results in an average BIBI below 4.00. For all of these reasons, this particular stream segment does not meet the Tier II threshold and thus should be removed from the list of Tier II waters.

**Tables 67:** This table shows all MBSS station data that has been sampled on this segment. The reader can see that the average BIBI score remains below 4.00.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
AL-A-146-301-95	FIFTEENMILE CREEK	225799.1	275448.3	39.6917823	78.45203515	4	4.33333333
AL-A-207-307-95	FIFTEENMILE CREEK	225251.1	275146.8	39.6868042	78.45544763	4	3.66666667
FIMI-307-R-2015	FIFTEEN MILE CREEK	225202.484	275171.56	39.68637	78.45515	3.75	3.66666667
FIMI-207-S-2000	FIFTEENMILE CREEK	225241.5	275124	39.6867145	78.45571158	3.75	5
FIMI-207-S-2001	FIFTEENMILE CREEK	225241.5	275124	39.6867145	78.45571158	3.75	5
FIMI-207-S-2002	FIFTEENMILE CREEK	225241.5	275124	39.6867145	78.45571158	3.75	5
FIMI-207-S-2003	FIFTEENMILE CREEK	225241.5	275124	39.6867145	78.45571158	4.25	5
FIMI-207-S-2004	FIFTEENMILE CREEK	225241.5	275124	39.6867145	78.45571158	4	4.66666667
FIMI-207-S-2005	FIFTEENMILE CREEK	225241.5	275124	39.6867145	78.45571158	4	4.66666667
FIMI-207-S-2006	FIFTEENMILE CREEK	225241.5	275124	39.6867145	78.45571158	3.75	4.66666667
FIMI-207-S-2007	FIFTEENMILE CREEK	225241.5	275124	39.6867145	78.45571158	4.25	4.66666667
FIMI-207-S-2008	FIFTEEN MILE CREEK	225241.5	275124	39.68671	78.45571	4	4.66666667
FIMI-207-S-2009	FIFTEENMILE CREEK	225241.5	275124	39.68671	78.45571	4.5	4.66666667
FIMI-207-S-2010	FIFTEENMILE CREEK	225241.5	275124	39.68671	78.45571	3.75	5
FIMI-207-S-2011	FIFTEEN MILE CREEK	225240.996	275124.13	39.68671	78.45571	3.5	3.66666667
FIMI-207-S-2012	FIFTEEN MILE CREEK	225241.5	275124	39.686715	78.455712	4	4.66666667
FIMI-207-S-2013	FIFTEEN MILE CREEK	225241.5	275124	39.686715	78.455712	4	4.66666667
FIMI-207-S-2014	FIFTEEN MILE CREEK	225241.5	275124	39.686715	78.455712	3.75	4.66666667
FIMI-207-S-2015	FIFTEEN MILE CREEK	225241.5	275124	39.686715	78.455712	3	4
FIMI-207-S-2016	Fifteen Mile Creek	225241.5	275124	39.686715	78.455712	3	4.33333333
					Average	3.8375	4.53

## Tier II Segment Proposed for Deletion: Indian Run 1

Table 78: Tier II stream as shown in COMAR 26.08.02.04-1 on 8/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Indian Run 1	Baltimore Co.	021308050307	39.54821	-76.74264	39.54230	-76.73384	4.00	4.33



Figure 6: Location map for Tier II stream proposed for removal, Indian Run 1, displayed as the orange segment between the light green dots.

Table 89: MBSS data used in original Tier II designation. The BIBI score highlighted in yellow is the incorrect BIBI score.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
LOCH-213-R-2002	INDIAN RUN	208140.5	422560.5	39.541369799	76.737558047	4.33	4.00

Table 20: Corrected MBSS data used to support removal of stream from the Tier II designation list in COMAR 26.08.02.04-1. The score highlighted in green is the corrected BIBI score.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
LOCH-213-R-2002	INDIAN RUN	208140.5	422560.5	39.541369799	76.737558047	3.33	4.00

### **History of the Original Tier II Designation**

This stream segment was designated as Tier II in 2007 solely using the IBI scores from MBSS station LOCH-213-R-2002. Since it was the only sample available at the time of assessment, the two IBI (BIBI and FIBI) scores were enough to designate the stream segment as Tier II. At that time, MDE was using the spreadsheet, named "MBSSMergedR1R2\_08Nov2005.xls", which had a number of BIBIs incorrectly calculated.

### **Justification for Tier II Removal**

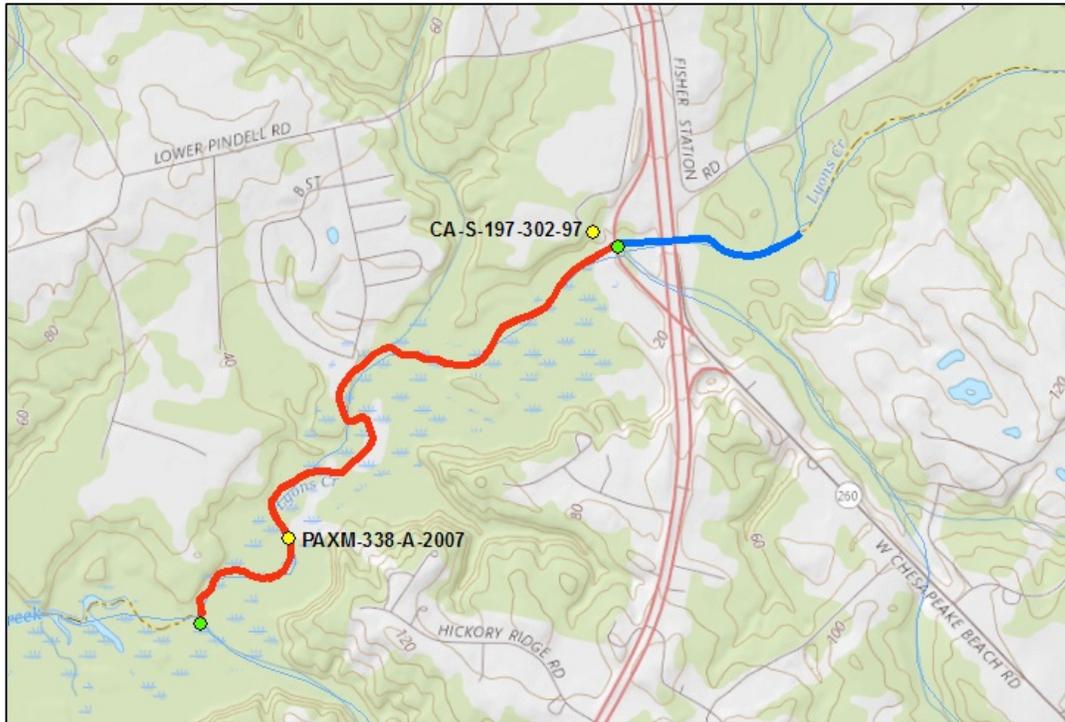
In 2008 it was discovered that there was a mathematical error in the BIBI calculation. The corrected BIBI for LOCH-213-R-2002 is 3.33. As this is still the only station on the stream segment, Indian Run 1 no longer meets the minimum threshold for Tier II stream designation, which is at least a score of 4.00 for both fish and benthos. Therefore, MDE is removing Indian Run 1 from the list of designated waters currently in COMAR 26.08.02.04-1.

## Tier II Segment Proposed for Deletion: Lyons Creek 2

Table 21: Tier II stream (Lyons Creek 2) as shown in COMAR 26.08.02.04-1 on 8/8/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Lyons Creek 2	Anne Arundel, Calvert	021311020909	38.76498	-76.65334	38.76474	-76.65903	4.67	5.00

Figure 7: Location map for Tier II stream proposed for removal (Lyons Creek 2 indicated by thick blue line), and new addition



(Lyons Creek 3 indicated by the red line between the two light green dots).

Table 22: MBSS data used in Tier II designation for Lyons Creek 3.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
CA-S-197-302-97	LYONS CREEK	121973.3	429569	38.76498929	76.65976601	5.00	4.67
PAXM-338-A-2007	LYONS CREEK	121151.1	428745.9	38.75761	76.66927	3.00	4.00

### **History of the Original Tier II Designation**

This stream segment was designated as Tier II in 2007 solely using the IBI scores from MBSS station CA-S-197-302-97. At the time, staff thought that this station was sampled in the location indicated by the thick blue line, shown above. Since it was the only sample available at the time of assessment, the two IBI scores were enough to designate as Tier II.

### **Justification for Tier II Removal**

After conferring with DNR staff in 2011, the location of the baseline sampling station CA-S-197-302-97 was corrected, applying to the stream segment downstream of its original designated stream segment. A second MBSS station, PAXM-338-A-2007, was also located on the same stream segment. It is MDE's procedure when identifying Tier II waters to average the IBI scores for MBSS stations sampled on the same reach. The average score of the two stations met the Tier II threshold of 4.00 for each fish and benthos, which was enough to designate the stream segment as Tier II. The new Tier II stream designation is Lyons Creek 3. In light of the location correction, there is no MBSS data available for the Tier II segment identified as Lyons Creek 2. Therefore, MDE is removing Lyons Creek 2 from the list of designated waters currently in COMAR 26.08.02.04-1. This change results in no net change in the total number of designated Tier II stream segments.

## Tier II Segment Proposed for Deletion: Mudlick Hollow 1

Table 93: Tier II stream as shown in COMAR 26.08.02.04-1 on 6/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Mudlick Hollow 1	Allegany	021405110141	39.69590	-78.39292	39.65611	-78.40011	4.33	4.50

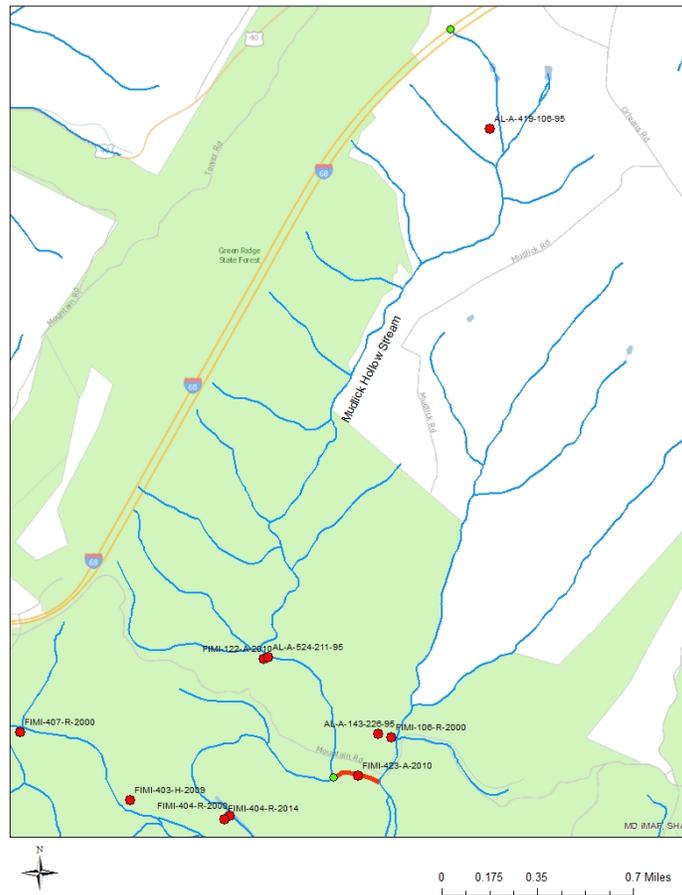


Figure 8: Location Map for Mudlick Hollow showing the location of MBSS sites. Green dots show the extent of Mudlick Hollow incorrectly identified as Tier II. Three stations (red dots) have been sampled on Mudlick Hollow to date. Please note that the streams shown are from the 1:24,000 scale NHD.

Table 104: MBSS data used in original Tier II designation.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
AL-A-524-211-95	FIFTEENMILE CREEK UT3	222476.6	279454.3	39.66243	78.40474	4.5	4.333333

Table 115: MBSS station with BIBI score that should have been included in the Tier II assessment. Note: The FIBI score (highlighted) from this station was removed from assessment due to a catchment size less than 300 acres.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
AL-A-419-106-95	FIFTEENMILE CREEK UT3 UT1	225588	280756.9	39.69063	78.39012	3	1

### History of the Original Tier II Designation

This water was designated as Tier II in 2007 solely using the IBI scores from MBSS station AL-A-524-211-95. At the time, staff disregarded the IBI scores from another station (AL-A-419-106-95) sampled that same year on the same reach. Part of the reason for this was that station AL-A-419-106-95 was sampled in the headwaters of Mudlick Hollow which had only a small 143 acre catchment. The biological assessment methodology for MBSS data states that for stations with less than a 300 acre catchment, FIBI scores below 3.00 will be removed from any assessment or analysis. This is done because headwater streams tend to have limited fish habitat and naturally low fish diversity and thus the FIBI often underrates these streams. For an unknown reason, state assessors incorrectly also disregarded the BIBI score from AL-A-419-106-95.

### Justification for Tier II Removal

Since MDE’s procedure for identifying Tier II waters is to average the IBI scores for MBSS stations sampled on the same reach, the assessors should have averaged the BIBI score from AL-A-419-106-95 and AL-A-524-211-95. This would have resulted in an average BIBI of 3.75, below the Tier II threshold of 4.00, and thus resulting in no Tier II designation. (Regardless, the FIBI score (FIBI: 1.00) from AL-A-419-106-95 would not have been used due to the biological assessment procedure for FIBIs in watersheds <300 acres.) This error was discovered some time later during another Tier II identification effort and is now proposed for correction.

It is worth noting that the location of AL-A-524-211-95 was resampled in 2010 (station FIMI-122-A-2010) and though this data showed high scores, when averaged with the BIBI score from AL-A-419-106-95 still does not meet the Tier II identification threshold of 4.00. Data from FIMI-122-A-2010 is provided below.

Table 126: MBSS station FIMI-122-A-2010 sampled at the same location as AL-A-524-211-95.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
FIMI-122-A-2010	FIFTEENMILE CREEK UT	222467.2	279431.3	39.66234	78.40501	4.25	3.666667

## Tier II Segment Proposed for Deletion: Murley Branch 1

Table 137: Tier II stream as shown in COMAR 26.08.02.04-1 on 8/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FBI	Baseline BIBI
2007	Murley Branch 1	Allegany	021405120130	39.66398	-78.61768	39.66340	-78.61151	4.33	4.00

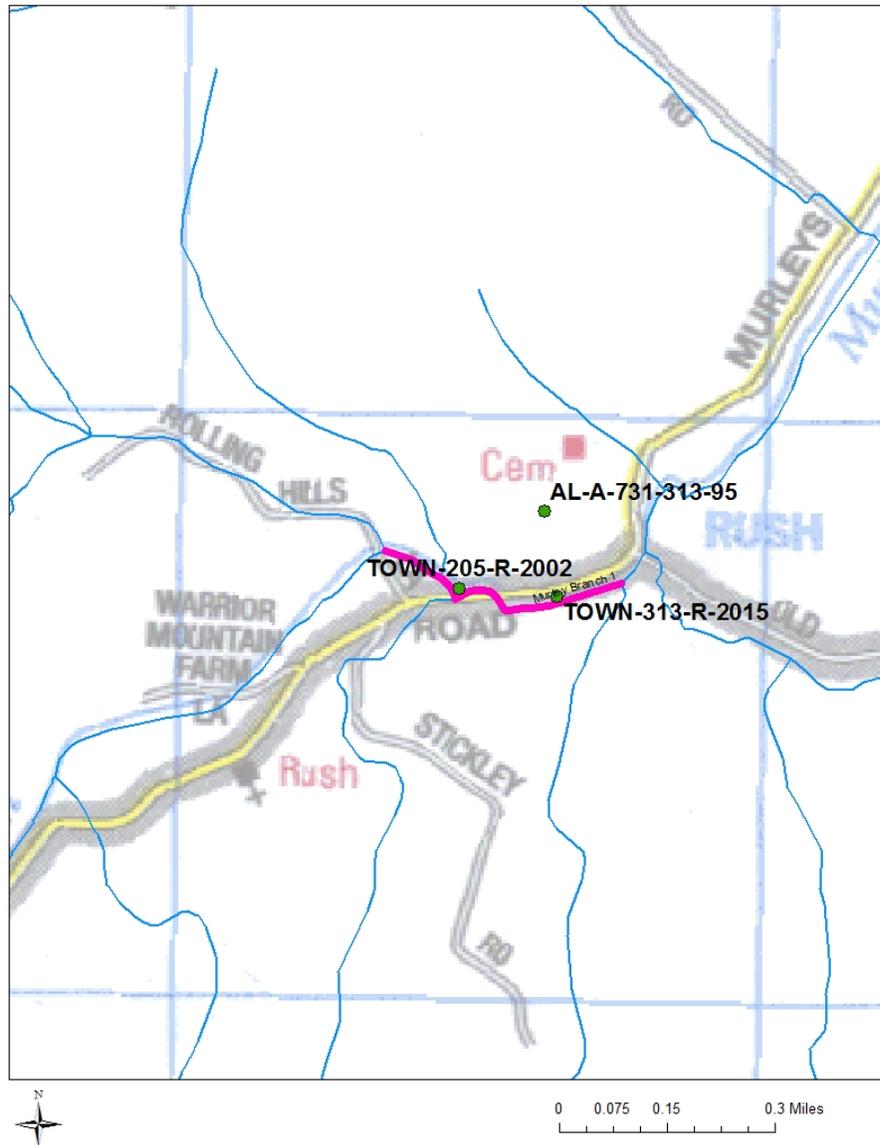


Figure 9: Location map for Tier II stream proposed for removal, Murley Branch 1, displayed as the pink segment. MBSS stations sampled to date are also shown on this map.

**Table 148: MBSS data used in original Tier II designation. Incorrect score highlighted in yellow.**

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
TOWN-205-R-2002	MURLEY BRANCH	222867	261352.8	39.663245745	78.615724263	4.00	4.33

**Table 29: Corrected MBSS data used to support removal of stream from the Tier II designation list in COMAR 26.08.02.04-1. Corrected score highlighted in green.**

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
TOWN-205-R-2002	MURLEY BRANCH	222867	261352.8	39.663245745	78.615724263	3.75	4.00

### History of the Original Tier II Designation

This stream segment was designated as Tier II in 2007 solely using the IBI scores from MBSS station TOWN-205-R-2002. Since it was the only sample available at the time of assessment, the two IBI scores were enough to designate the stream segment as Tier II.

### Justification for Tier II Removal

In 2008 it was discovered that there was a mathematical error in the IBI calculation. The corrected BIBI for TOWN-205-R-2002 is 3.75 and thus, on the basis of this station alone, the Murley Branch segment did not meet the Tier II threshold (4.00) for each IBI score.

At the time of re-evaluation of Murley Branch it was also discovered that another station, AL-A-731-313-95, had been sampled on this same stream segment (after conferring with DNR). This station, sampled even earlier (in 1995) than TOWN-205-R-2002, also did not have a BIBI score at or above the Tier II threshold of 4.00. Thus, averaging these BIBIs also did not support a Tier II stream designation.

**Table 30: IBI scores for MBSS station AL-A-731-313-95.**

SITEYR	bibi_05	FIBI_05	ACREAGE	Latitude83	Longitude83
AL-A-731-313-95	3.25	4.333333	3312.73	39.66483	78.61353

Since that time, this segment of Murley Branch has been sampled one additional time (table below) in 2015 with the BIBI score still remaining below the Tier II threshold level. Therefore, MDE is removing Murley Branch 1 from the list of designated waters currently in COMAR 26.08.02.04-1.

**Table 31: More recent MBSS sampling yielded the following IBI scores for this segment.**

SITEYR	bibi_05	FIBI_05	ACREAGE	Latitude83	Longitude83
TOWN-313-R-2015	2.5	4.666667	2081.606	39.66311	78.61319

## Tier II Segment Proposed for Deletion: North Branch Patapsco River 2

Table 32: Tier II stream as shown in COMAR 26.08.02.04-1 on 6/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	North Branch Patapsco River 2	Carroll	021309071048	39.52579	-76.87790	39.52245	-76.87527	4.00	4.00

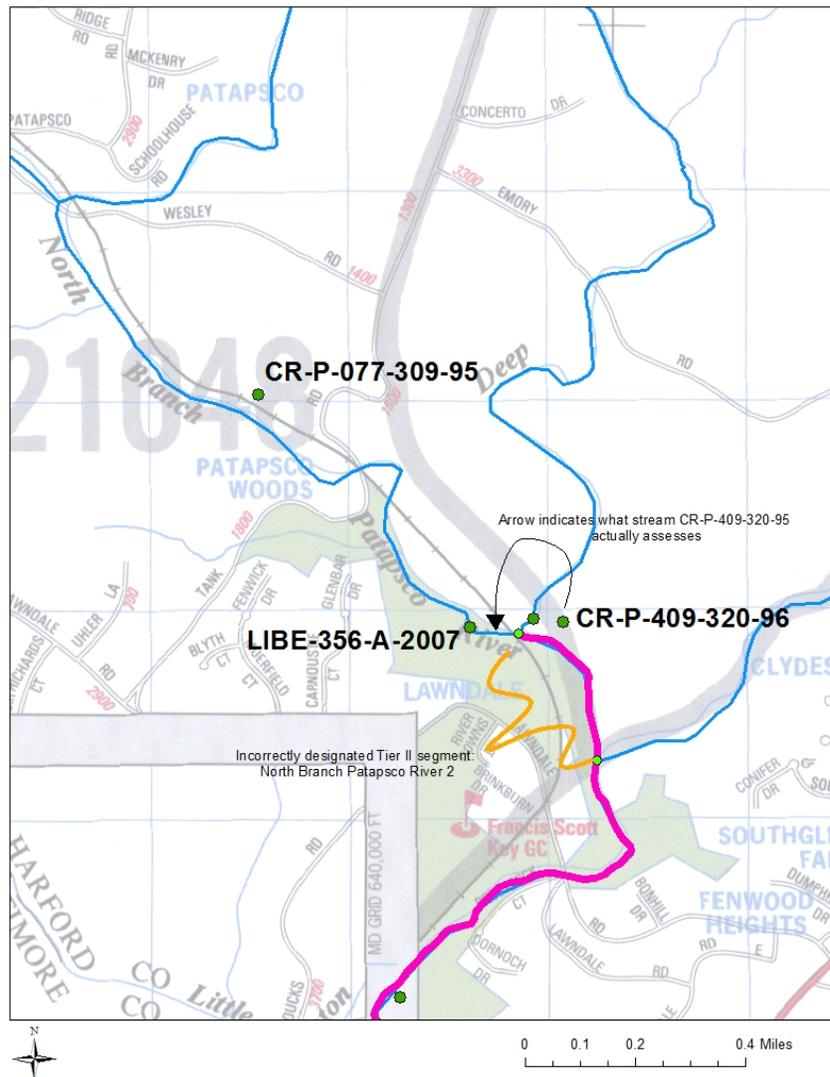


Figure 20: Location Map for Tier II water being removed, North Branch Patapsco River 2. MBSS station CR-P-409-320-96 was originally thought to be sampled on the segment bounded by light green dots. However after conferring with DNR, it was correctly applied to the segment indicated by the arrow.

Table 33: Sole MBSS data used in original Tier II designation on the incorrect downstream segment.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
CR-P-409-320-96	NORTH BRANCH PATAPSCO RIVER	206417.9	410625.8	39.52608	76.87642	4	4

Table 34: Additional MBSS station data that was subsequently averaged with CR-P-409-320-96, once the correct location was identified.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
CR-P-077-309-95	NORTH BRANCH PATAPSCO RIVER	207082.7	409736.4	39.53208	76.88675	3	4.333333

### History of the Original Tier II Designation

This water was designated as Tier II in 2007 solely using the IBI scores from MBSS station CR-P-409-320-96. At the time, staff thought that this station was sampled on the North Branch Patapsco River in a location downstream of the confluence with Deep Run. Since it was the only sample available at the time of assessment, the two IBI scores were enough to designate as Tier II. However, after conferring with DNR staff, the location of this MBSS station was later corrected to be on a part of the North Branch Patapsco upstream of the confluence with Deep Run (See map above).

### Justification for Tier II Removal

After correcting the location of CR-P-409-320-96, MDE staff reassessed this data for meeting the Tier II threshold. Since MDE’s procedure for identifying Tier II waters is to average the IBI scores for MBSS stations sampled on the same reach, the assessors averaged the IBI scores from CR-P-077-309-95 with those from CR-P-409-320-96 giving an average BIBI of 3.5 and an average FIBI of 4.5. Since the average BIBI was below the Tier II threshold of 4.00 this assessment resulted in no Tier II designation.

It is worth noting that in 2007, this segment, upstream of the confluence with Deep Run was sampled again. That data is shown below. Even averaging the IBI scores from all three sites does not meet the Tier II designation threshold.

Table 35: MBSS station data from station that was sampled in 2007.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
LIBE-356-A-2007	NORTH BRANCH PATAPSCO RIVER	206401.9	410354.9	39.52594	76.87957	4	4.666667

## Tier II Segment Proposed for Deletion: Persimmon Creek 1

Table 36: Tier II stream as shown in COMAR 26.08.02.04-1 on 8/8/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Persimmon Creek 1	Saint Mary's	021311010880	38.42150	-76.71305	38.44077	-76.69696	4.00	4.14

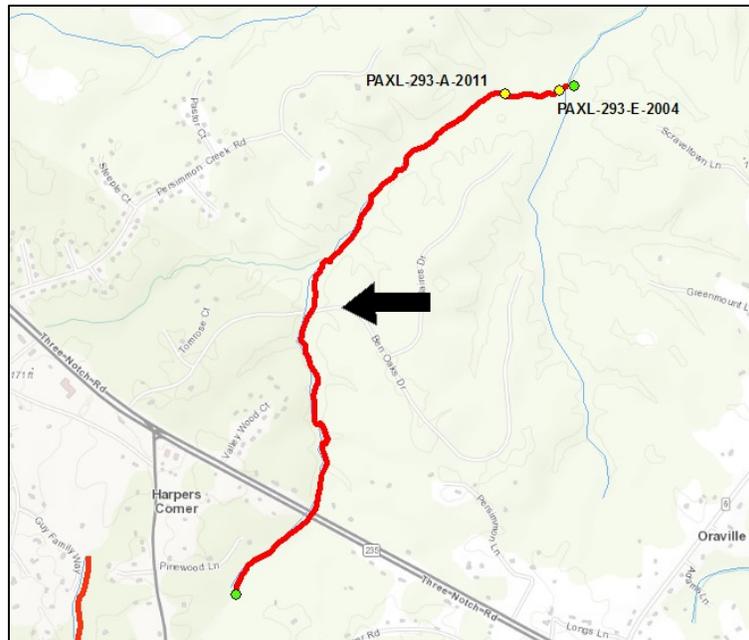


Figure 31: Location map for Tier II stream proposed for removal, Persimmon Creek 1, displayed as the red segment between the light green dots, with the arrow.

Table 37: MBSS data used in original Tier II designation. Please note the BIBI score highlighted in yellow is incorrect.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
PAXL-293-E-2004	PERSIMMON CREEK	85947.5	426420.1	38.440545378	76.697372548	4.14	4.00

Table 38: Corrected MBSS data used to support removal of stream from the Tier II designation list in COMAR 26.08.02.04-1. Please note that the BIBI score highlighted in green is the correct score.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
PAXL-293-E-2004	PERSIMMON CREEK	85947.5	426420.1	38.440545378	76.697372548	3.29	4.00

### History of the Original Tier II Designation

This stream segment was designated as Tier II in 2007 solely using the IBI scores from MBSS station PAXL-293-E-2004. Since it was the only sample available at the time of assessment, the two IBI scores were enough to designate the stream segment as Tier II.

### Justification for Tier II Removal

In 2008 it was discovered that there was a mathematical error in the IBI calculation. The corrected BIBI for PAXL-293-E-2004 is 3.29 and thus, on the basis of this station alone, the Persimmon Creek segment did not meet the Tier II threshold (4.00) for each IBI score.

Later, in 2011, a second MBSS station, PAXL-293-A-2011, was sampled on the same stream segment. The IBI scores for this station were averaged with those of PAXL-293-E-2004. (MDE averages the IBI scores for MBSS stations sampled on the same reach.) However, the average score of the two stations still did not meet the Tier II threshold of 4.00 for each fish and benthos. As a result, since the stream segment identified as Persimmon Creek 1 no longer meets the Tier II IBI thresholds, MDE is removing Persimmon Creek 1 from the list of designated waters currently in COMAR 26.08.02.04-1.

Table 39: Scores both MBSS sites along with the average of each IBI.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
PAXL-293-E-2004	PERSIMMON CREEK	85947.5	426420.1	38.440545378	76.697372548	3.29	4.00
PAXL-293-A-2011	PERSIMMON CREEK	85936.372	426189.006	38.440452	76.70002	4.14	3.67
					Average	3.72	3.84

## Tier II Segment Proposed for Deletion: Saint Marys River UT 1

Table 40: Tier II stream as shown in COMAR 26.08.02.04-1 on 8/8/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Saint Marys River UT 1	Saint Mary's	021401030710	38.21487	-76.43063	38.21155	-76.45141	4.00	4.00

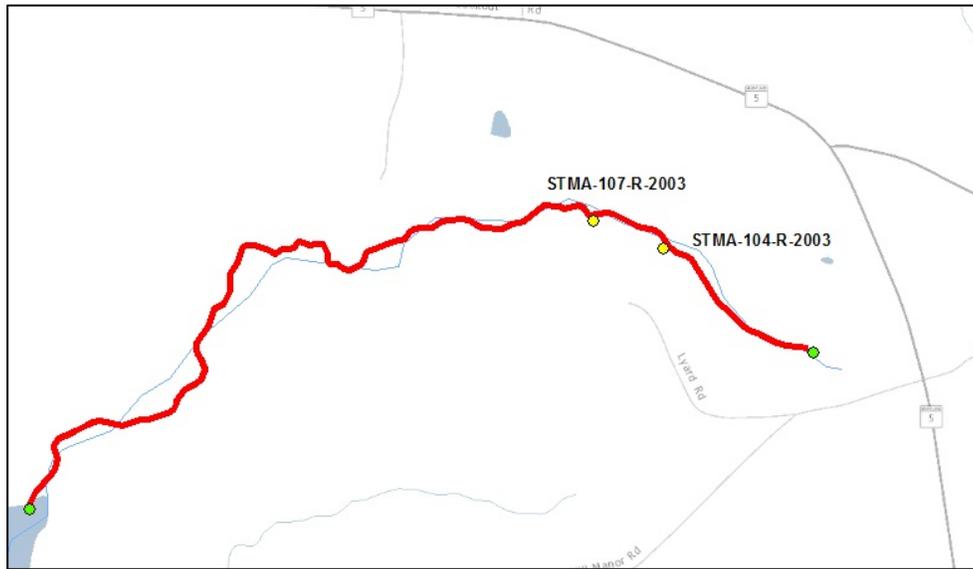


Figure 42: Location map for Tier II stream proposed for removal, Saint Marys River UT 1, displayed as the red segment between the light green dots.

Table 41: MBSS data used in original Tier II designation. Note 'StreamName' field in the MBSS database is not the source of the Tier II Stream Segment Name. Please note that the score highlighted in yellow was the original incorrect BIBI score.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
STMA-104-R-2003	MARTIN COVE UT1	61232.2	449526.4	38.216901973	-76.434461828	4.14	4.00
STMA-107-R-2003	MARTIN COVE UT1	61297.7	449364.9	38.217501038	-76.436301319	3.86	4.00

**Table 42: Corrected MBSS data used to support removal of stream from the Tier II designation list in COMAR 26.08.02.04-1. Note' StreamName' field in the MBSS database is not the source of the Tier II Stream Segment Name. The BIBI score highlighted in green is the correct score.**

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
STMA-104-R-2003	MARTIN COVE UT1	61232.2	449526.4	38.216901973	76.434461828	3.86	4.00
STMA-107-R-2003	MARTIN COVE UT1	61297.7	449364.9	38.217501038	76.436301319	3.86	4.00
					Average	3.86	4.00

### **History of the Original Tier II Designation**

This stream segment was designated as Tier II in 2007 using the IBI scores from MBSS station STMA-104-R-2003 and STMA-107-R-2003. It is MDE’s procedure when identifying Tier II waters to average the IBI scores for MBSS stations sampled on the same reach. The average score of the two stations met the Tier II threshold of 4.00 for each fish and benthos, which was enough to designate the stream segment as Tier II.

### **Justification for Tier II Removal**

In 2008 it was discovered that there was a mathematical error in the IBI calculation. The corrected BIBI for STMA-104-R-2003 is 3.86, while STMA-107-R-2003 remained unchanged. For the stream segment identified as Saint Marys River UT 1, the updated average score of the two stations no longer met the Tier II threshold of 4.00 for each fish and benthos. Therefore, MDE is removing Saint Marys River UT 1 from the list of designated waters currently in COMAR 26.08.02.04-1.

## Tier II Segment Proposed for Deletion: Saint Marys River UT 2

Table 43: Tier II stream as shown in COMAR 26.08.02.04-1 on 8/8/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Saint Marys River UT 2	Saint Mary's	021401030712	38.21065	-76.40308	38.19760	-76.41921	5.00	4.14

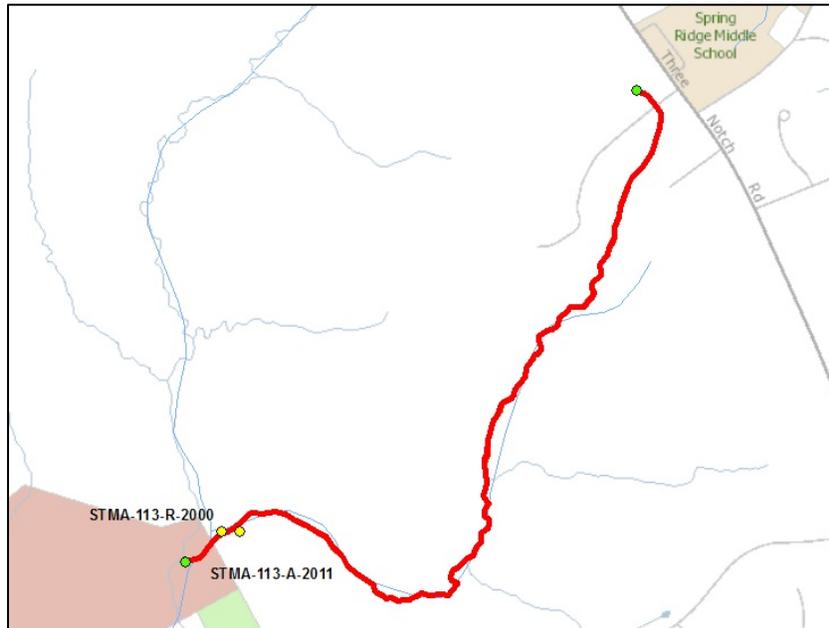


Figure 53: Location map for Tier II stream proposed for removal, Saint Marys River UT 2, displayed as the segment between the light green dots.

Table 44: MBSS data used in original Tier II designation. Note' StreamName' field in the MBSS database is not the source of the Tier II Stream Segment Name. The BIBI score highlighted in yellow is the original incorrectly calculated BIBI score.

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
STMA-113-R-2000	ST MARYS RIVER UT1	59185.5	450996	38.198380762	76.417830068	4.14	5.00

**Table 45: Corrected MBSS data used to support removal of stream from the Tier II designation list in COMAR 26.08.02.04-1. Note' StreamName' field in the MBSS database is not the source of the Tier II Stream Segment Name. The BIBI score highlighted in green is the corrected score.**

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
STMA-113-R-2000	ST MARYS RIVER UT1	59185.5	450996	38.198380762	76.417830068	3.86	5.00

### History of the Original Tier II Designation

This stream segment was designated as Tier II in 2007 solely using the IBI scores from MBSS station STMA-113-R-2000. Since it was the only sample available at the time of assessment, the two IBI scores were enough to designate the stream segment as Tier II.

### Justification for Tier II Removal and Subsequent Re-Addition

In 2008 it was discovered that there was a mathematical error in the IBI calculation. The corrected BIBI for STMA-113-R-2000 is 3.86. As this was the only station on the stream segment at that time, Saint Marys River UT 2 was determined to no longer meet the minimum criteria for Tier II stream threshold (which is having at least a score of 4.00 for both fish and benthos) and was therefore removed from the public list of Tier II waters.

This same stream segment was then later sampled by DNR MBSS in 2011. The 2011 BIBI and FIBI scores were then averaged (as per protocols) with those of the earlier sampled station (STMA-113-R-2000). This yielded an average BIBI of 4.00 and an average FIBI of 4.67 (see table below), thus leading to a redesignation of this stream segment as Tier II. Important to note is that the actual name of this stream segment was determined to be Fisherman Creek. Thus, when the redesignation occurred the stream segment was named Fisherman Creek 1, instead of St. Mary's River UT2. In the 2013 Triennial Review of Water Quality Standards (TR), Fisherman Creek 1 was properly added to the Tier II list in COMAR 26.08.02.04-1 O. but the name "St. Mary's River UT 2" was not correspondingly removed. This mistake was identified prior to the 2016 TR, whereupon its removal was proposed and completed. In summary, there was no net loss of a Tier II stream segment in this case, but rather a replacement of St. Mary's River UT2 by Fisherman Creek 1.

**Table 15: Table showing the average BIBI and FIBI score for the two stations sampled on Fisherman Creek.**

SITEYR	StreamName	Northing83	Easting83	Latitude83	Longitude83	bibi_05	FIBI_05
STMA-113-R-2000	ST MARYS RIVER UT1	59185.5	450996	38.198380762	76.417830068	3.86	5.00
STMA-113-A-2011	FISHERMAN CREEK	59186.889	451052.936	38.19839	76.41718	4.14	4.33
					Average	4.00	4.67

## Tier II Segment Proposed for Deletion: Savage River 3

Table 16: Tier II stream as shown in COMAR 26.08.02.04-1 on 6/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Savage River 3	Garrett	021410060075	39.50101	-79.10657	39.48643	-79.08279	4.33	4.13

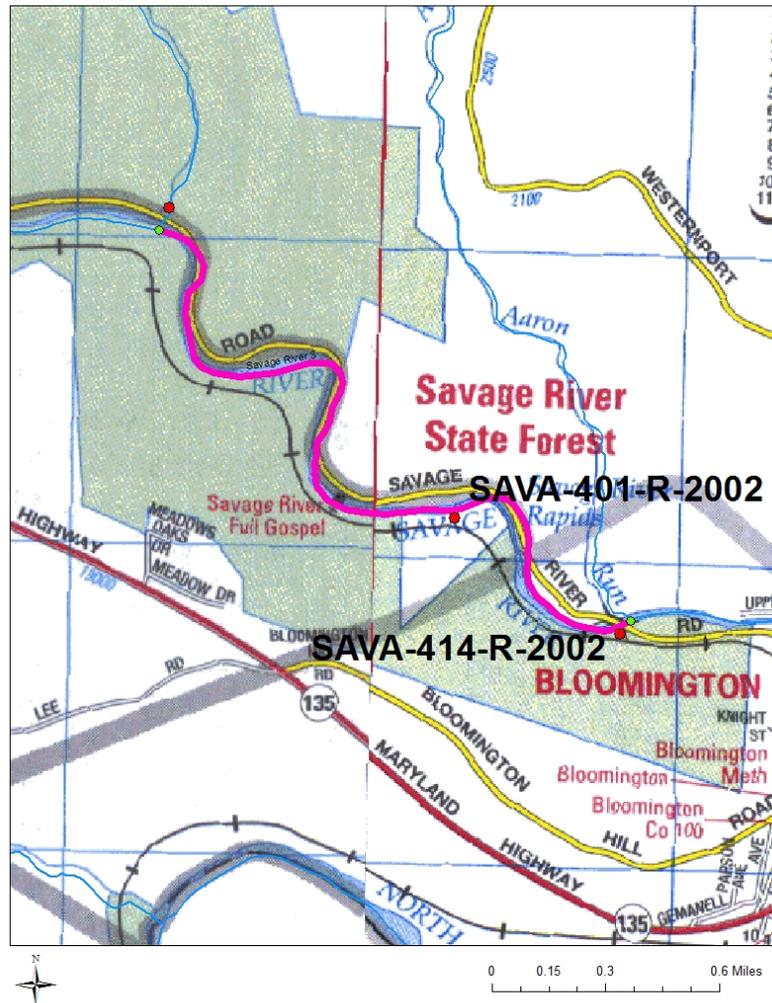


Figure 64: Location map for the Tier II water (Savage River 3) segment (in pink) proposed for removal. Two stations, SAVA-401-R-2002 and SAVA-414-R-2002 (shown as red dots) were used to designate this segment as Tier II.

## History of the Original Tier II Designation and Justification for Tier II Removal

This water was designated as Tier II in 2007 using the IBI scores obtained from two MBSS stations (see table below). At that time, MDE was using a spreadsheet, named “MBSSMergedR1R2\_08Nov2005.xls” which had a number of BIBIs incorrectly calculated. In the case of Savage River 3, the BIBI scores from the two sites, SAVA-401-R-2002 and SAVA-414-R-2002, were incorrectly calculated (see the tables below). This led to an inflated average BIBI score for this stream segment. (Please note that MDE independently averages all BIBI and FIBI scores obtained from the same stream segment.) After this mistake was discovered, the resulting BIBI scores decreased and caused the overall stream segment BIBI average to be below the Tier II designation threshold of 4.00. As a consequence, this segment had to be removed from the list of Tier II waters.

As of the time this document was written there were no other MBSS sampling events completed on this stream segment.

**Table 17: MBSS data used in original Tier II designation. Please note the highlighted BIBI scores. These scores were lowered after the BIBI calculation error was corrected. (The scores highlighted in yellow are the original incorrect scores.)**

SITEYR	BIBI_05	FIBI_05	ACREAGE	LAT	LONG
SAVA-401-R-2002	4.25	4.33	70623.58	39.4902423	-79.0916211
SAVA-414-R-2002	4.00	4.33	73030.93	39.4859143	-79.0833265
Average	4.13	4.33			

**Table 18: This table shows the recalculation of the baseline IBIs for this water segment after the BIBI’s were correctly calculated. The revised BIBI scores are highlighted in green. After correction, the average BIBI does not meet the Tier II threshold of 4.00.**

SITEYR	BIBI_05	FIBI_05	ACREAGE	LAT	LONG
SAVA-401-R-2002	4	4.333333	70623.3	39.490242	79.0916211
SAVA-414-R-2002	3.5	4.333333	73030.7	39.485914	79.0833265
Average	3.75	4.333333			

## Tier II Segment Proposed for Deletion: Town Creek 2

Table 19: Tier II stream as shown in COMAR 26.08.02.04-1 on 6/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Town Creek 2	Allegany	021405120131	39.71306	-78.53643	39.69388	-78.54752	4.33	4.00

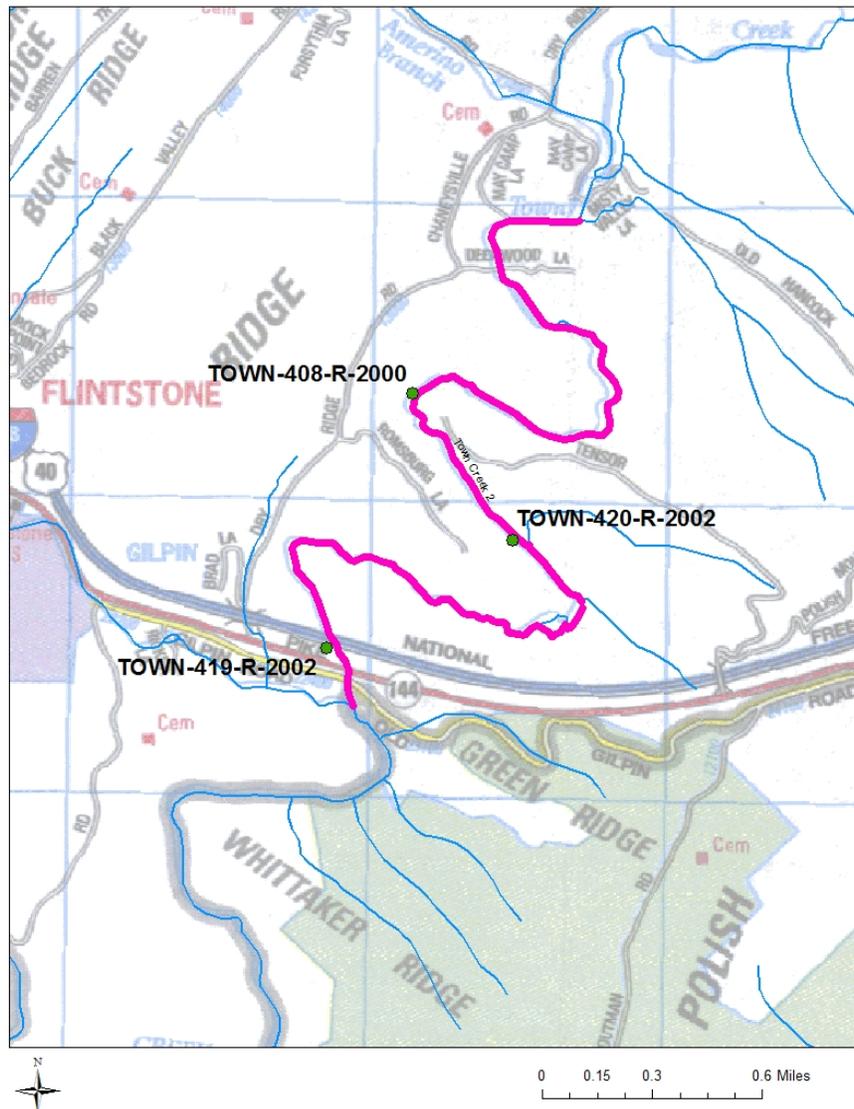


Figure 75: Location map for the Tier II water (Town Creek 2) segment (in pink) proposed for removal. Three stations, names shown in the map, were used to designate this segment as Tier II.

### History of the Original Tier II Designation and Justification for Tier II Removal

This water was designated as Tier II in 2007 using the IBI scores obtained from three MBSS stations (see table below). At that time, MDE was using a spreadsheet, named “MBSSMergedR1R2\_08Nov2005.xls” which had a number of BIBIs incorrectly calculated. In the case of Town Creek 2, the BIBI score from one site, TOWN-419-R-2002, was incorrectly calculated (see the tables below). This led to an inflated average BIBI score for this stream segment. (Please note that MDE independently averages all BIBI and FIBI scores obtained from the same stream segment.) After this mistake was discovered, the BIBI score was corrected to a lower value (3.75) than the original score. Subsequently, this lower score, when averaged with that of the other two MBSS BIBI scores, caused the overall stream segment BIBI average to go below the Tier II designation threshold of 4.00. As a consequence, the baseline BIBI for this segment does not meet the Tier II threshold and had to be removed from the list of Tier II waters. As of the time this document was written there were no other MBSS sampling events completed on this stream segment.

Table 20: MBSS data used in original Tier II designation. Please note the highlighted BIBI score. This score was lowered after the BIBI calculation error was corrected. (The score highlighted in yellow is the original incorrect score.)

SITEYR	BIBI_05	FIBI_05	ACREAGE	LAT	LONG
TOWN-408-R-2000	3.75	4.33	46445.71	39.7061428	-78.5447323
TOWN-419-R-2002	4.00	4.33	47166.38	39.6961181	-78.5488817
TOWN-420-R-2002	4.25	4.33	46656.38	39.7004428	-78.5394919
Average	4.00	4.33			

Table 21: This table shows the recalculation of the average baseline IBIs for this water segment after the one BIBI was corrected. The revised BIBI score is highlighted in green. After correction, the average BIBI does not meet the Tier II threshold of 4.00.

SITEYR	bibi_05	FIBI_05	ACREAGE	Latitude83	Longitude83
TOWN-408-R-2000	3.75	4.333333	46445.5	39.706143	78.5447323
TOWN-419-R-2002	3.75	4.333333	47166.2	39.696118	78.5488817
TOWN-420-R-2002	4.25	4.333333	46656.2	39.700443	78.5394919
Average	3.916667	4.333333			

## Tier II Segment Proposed for Deletion: Western Run 1

Table 22: Tier II stream as shown in COMAR 26.08.02.04-1 on 6/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2007	Western Run 1	Baltimore Co.	021308050303	39.51503	-76.74060	39.52739	-76.72217	4.00	4.00

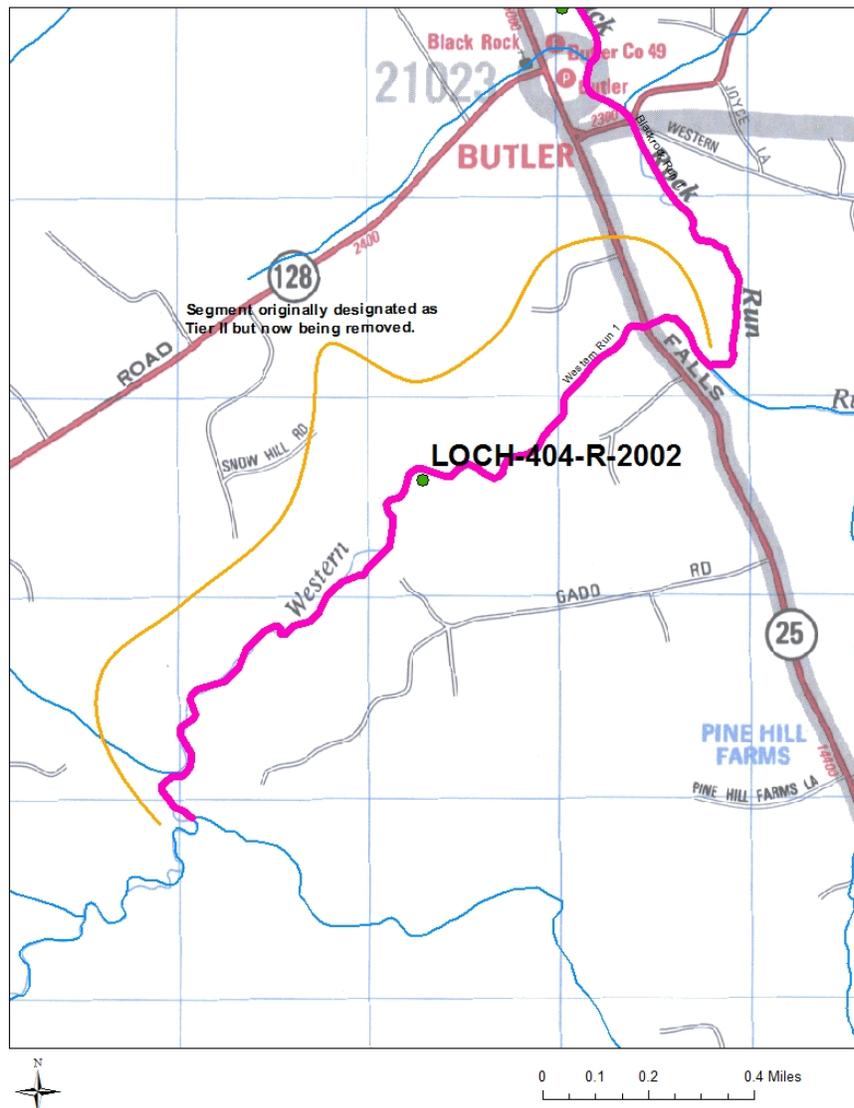


Figure 86: Location map for the water segment (in pink and bounded by an orange bracket) proposed for removal. One station, LOCH-404-R-2002 was used to designate this segment as Tier II.

### History of the Original Tier II Designation and Justification for Tier II Removal

This water was designated as Tier II in 2007 using the IBI score obtained from one MBSS station (see table below). At that time, MDE was using a spreadsheet, named “MBSSMergedR1R2\_08Nov2005.xls”, which had a number of BIBIs incorrectly calculated. In the case of Western Run 1, the BIBI score from the sampling station, LOCH-404-R-2002, was incorrectly calculated (see the table below). This led to an inflated BIBI score for this stream segment. After this mistake was discovered, the resulting BIBI score decreased and caused the BIBI to be below the Tier II designation threshold of 4.00. As a consequence, this segment had to be removed from the list of Tier II waters.

As of the time this document was written there were no other MBSS sampling events completed on this stream segment.

**Table 23: MBSS data used in original Tier II designation. Please note the highlighted BIBI scores. These scores were lowered after the BIBI calculation error was corrected. (The scores highlighted in yellow are the original incorrect scores.)**

SITEYR	bibi_05	FIBI_05	ACREAGE	Latitude83	Longitude83
LOCH-404-R-2002	4.00	4.00	24283.82	39.5242614	-76.7323822

**Table 24: This table shows the recalculation of the baseline IBI for this water segment after the BIBI was correctly calculated. The revised BIBI score is highlighted in green. After correction, the average BIBI does not meet the Tier II threshold of 4.00.**

SITEYR	bibi_05	FIBI_05	ACREAGE	Latitude83	Longitude83
LOCH-404-R-2002	3.67	4	24283.7	39.52426	-76.73238

## Tier II Segment Proposed for Name Change: Browns Branch 1

Table 25: Tier II stream as shown in COMAR 26.08.02.04-1 on 6/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2008	Browns Branch 1	Queen Anne's	021305080401	39.11759	-75.95646	39.11650	-75.96562	4.33	4.71

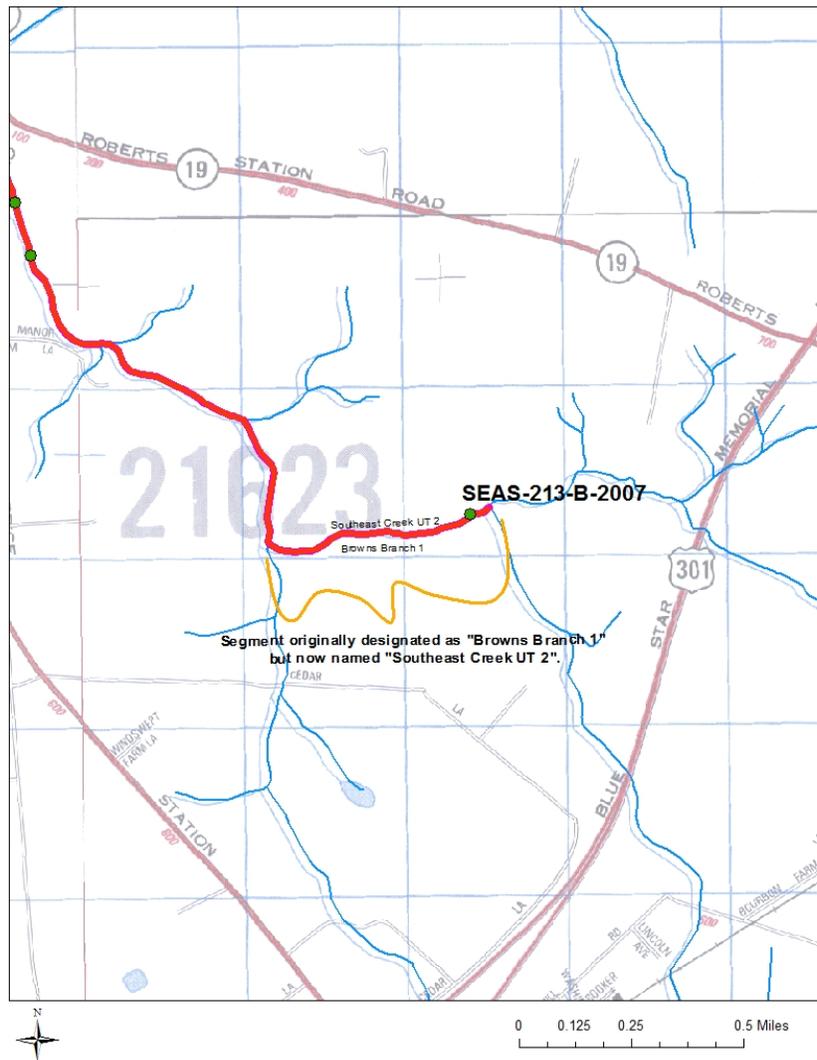


Figure 97: Location map for the Tier II segment Browns Branch 1 (in red and extent shown by orange bracket) that is being renamed to Southeast Creek UT 2. One station, SEAS-213-B-2007, was used to designate this segment as Tier II.

### **History of the Original Tier II Designation and Justification for Renaming**

This water was designated as Tier II in 2008 using the IBI score obtained from one MBSS station (see table above). At that time, MDE improperly named this Tier II segment as Browns Branch 1, confusing its location with that of a tributary to the north. This mistake was realized sometime later and the Tier II segment was properly renamed as Southeast Creek UT 2 to capture the fact that it wasn't in fact on Browns Branch at all but instead located on an unnamed tributary (UT) to Southeast Creek. This name change was first proposed on the 2016 Triennial Review of Water Quality Standards. In effect, this name change, involving the removal of the Browns Branch 1 name and addition of the Southeast Creek UT 2 name, results in no net change to the number of Tier II segments.

## Tier II Segment Proposed for Name Change: Browns Branch 2

Table 26: Tier II stream as shown in COMAR 26.08.02.04-1 on 6/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2008	Browns Branch 2	Queen Anne's	021305080401	39.11651	-75.96563	39.13035	-75.97788	4.44	4.71

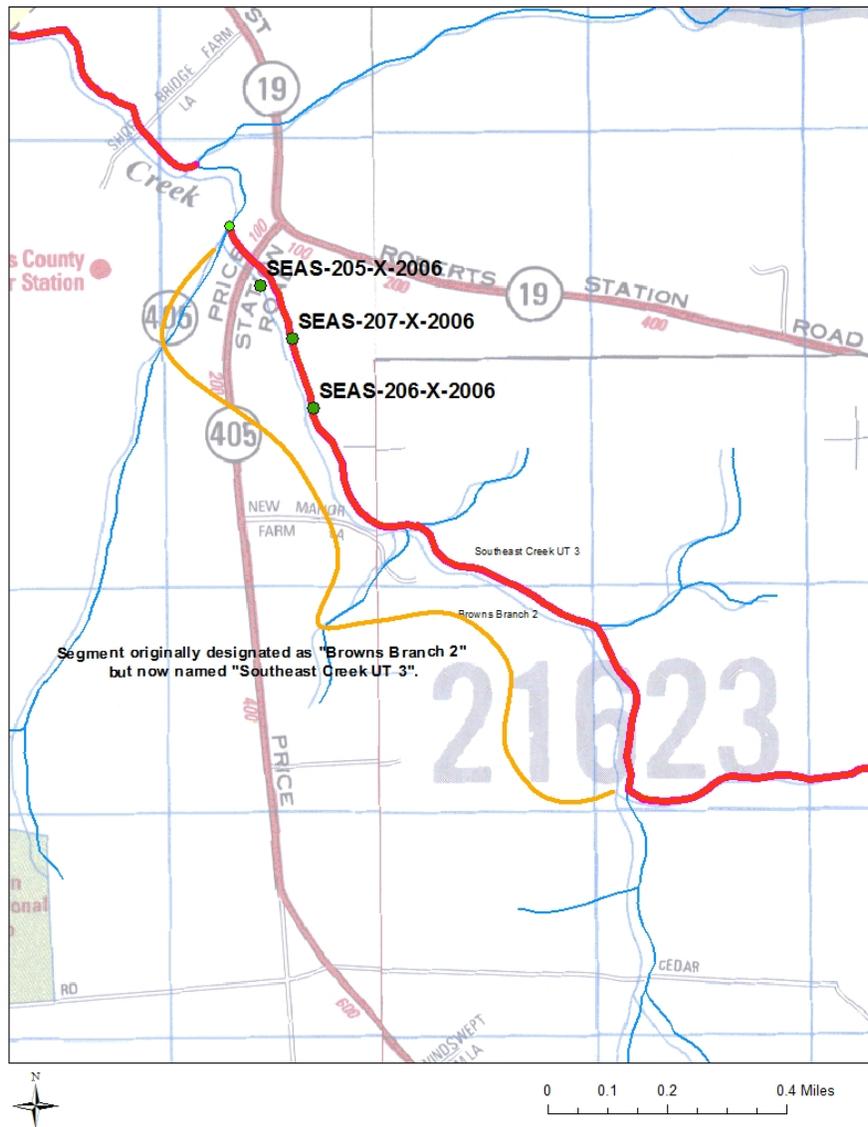


Figure 108: Location map for the Tier II segment (in red and extent shown by orange bracket) Browns Branch 2 that is being renamed to Southeast Creek UT 3. Three stations, shown above, were used to designate this segment as Tier II.

**Table 27: Stations used for designating this segment as Tier II. Please note that MDE averages IBI scores when more than one station has been sampled on a segment.**

SITEYR	bibi_05	FIBI_05	ACREAGE	Latitude83	Longitude83
SEAS-205-X-2006	4.71	4.33	4648.279	39.12889	-75.97694
SEAS-206-X-2006	4.43	5.00	4593.312	39.1259	-75.97532
SEAS-207-X-2006	5	4	4631.666	39.12759	-75.97596
Averages	4.71	4.44			

**History of the Original Tier II Designation and Justification for Renaming**

This water was designated as Tier II in 2008 using the IBI scores obtained from three MBSS stations (see table above). At that time, MDE improperly named this Tier II segment as Browns Branch 2, confusing its location with that of a tributary to the north. This mistake was realized sometime later and the Tier II segment was properly renamed as Southeast Creek UT 3 to capture the fact that it wasn't in fact on Browns Branch at all but an unnamed tributary (UT) to Southeast Creek. This name change was first proposed on the 2016 Triennial Review of Water Quality Standards. In effect, this name change, involving the removal of the Browns Branch 2 name and addition of the Southeast Creek UT 3 name, results in no net change to the number of Tier II segments.

## Tier II Segment Proposed for Name Change: Southeast Creek UT 1

Table 28: Tier II stream as shown in COMAR 26.08.02.04-1 on 6/7/2017.

Date	Stream Name	County	12-digit Watershed	From Lat	From Long	To Lat	To Long	Baseline FIBI	Baseline BIBI
2003	Southeast Creek UT 1	Queen Anne's	021305080403	39.15968	-75.92076	39.16360	-75.95177	4.33	5.00

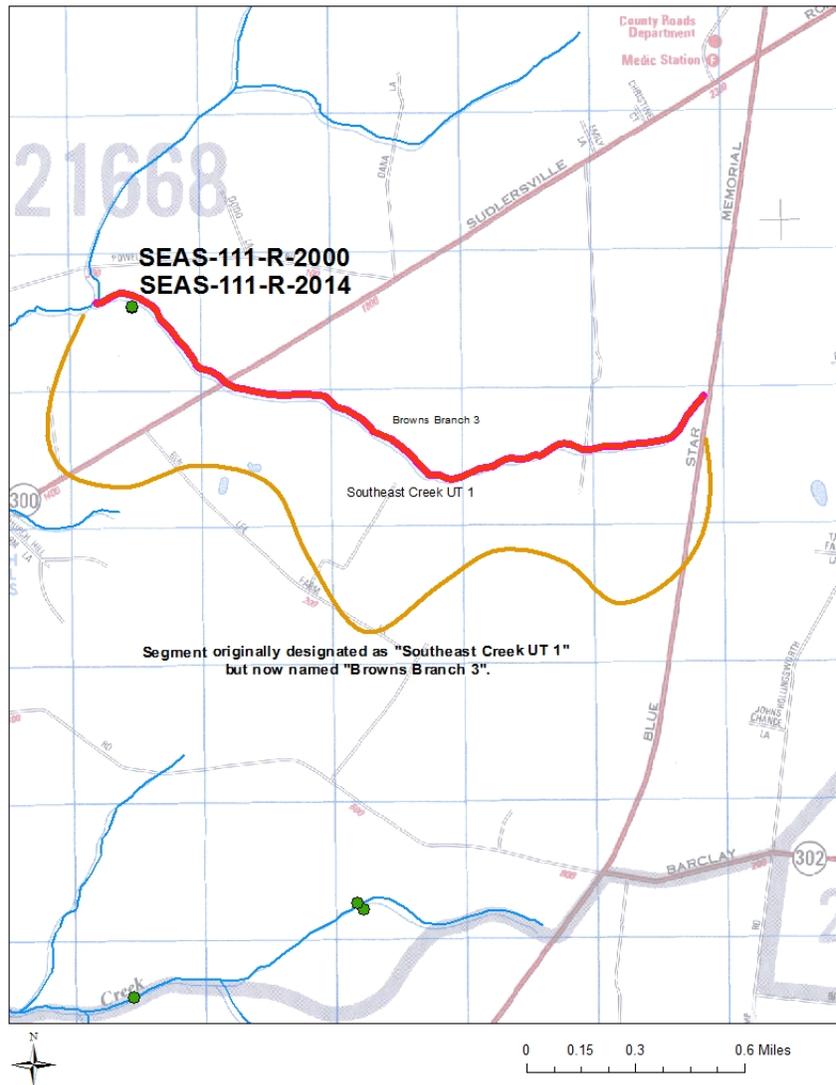


Figure 119: Location map for the Tier II segment (in red and extent shown by orange bracket) Southeast Creek UT 1 that is being renamed to Browns Branch 3. Only the one station, SEAS-111-R-2000, was used to designate this segment as Tier II in 2003.

Table 29: Baseline station used for designating this segment as Tier II. A second station (SEAS-111-R-2014) was sampled on this water segment in 2014 but this did not affect the baseline IBI scores or the original Tier II designation.

SITEYR	bibi_05	FIBI_05	ACREAGE	Latitude83	Longitude83
SEAS-111-R-2000	5	4.333333	1715.73	39.16335	75.95

### **History of the Original Tier II Designation and Justification for Renaming**

This water was designated as Tier II in 2003 using the IBI score obtained from one MBSS station (see table above). At that time, MDE improperly named this Tier II segment as Southeast Creek UT 1, confusing its location with that of a tributary to the south. This mistake was realized sometime later and the Tier II segment was properly renamed as Browns Branch 3 to capture the fact that it wasn't in fact on an unnamed tributary to Southeast Creek at all but instead on Browns Branch. This name change was first proposed on the 2016 Triennial Review of Water Quality Standards. In effect, this name change, involving the removal of the Southeast Creek UT 1 name and addition of the Browns Branch 3 name, results in no net change to the number of Tier II segments.