Enclosure 1

Statewide *E. coli* Total Maximum Daily Load (TMDL)
Addendum 2018
Impaired Water Bodies and Percent Reductions

This addendum contains a list of water bodies that are covered by the Statewide *E. coli* TMDL. All biennial updates of the Sections 303(d), 305(b), and 314 Integrated Report will include an addendum intended to build on Appendix 1 of the Statewide *E. coli* TMDL, as summarized in Section 1.2 of the Statewide *E. coli* TMDL and described in more detail in Appendix 2.

For each water body in the attached list, the ultimate water quality goal is to meet the requirements for removal contained in the Assessment Methodology Section of the most recently approved Integrated Report. The data summarized for each water body includes all sample results that are readily available and may not contain the exact dataset that was used in making the initial impairment decision (pursuant to the assessment methodology at the time the decision was made). The information in columns 3-12 of this addendum is provided for informational purposes only, to assist stakeholders in determining the magnitude of the problem in their water body.

To give stakeholders an overview of the water quality in the impaired waters, the attached table provides the following:

Column 1 - AUID - Michigan uses the National Hydrography Dataset to organize and identify water bodies for the Sections 303(d) and 305(b) lists. A base assessment unit is a 12-digit HUC, which may be split further into smaller assessment units depending on information such as land use, known areas of contamination, specific fish consumption advisories, physical barriers such as dams, etc. Each assessment unit is assigned a numeric identifier (AUID) and may consist of all water bodies in a 12-digit HUC (as a maximum) or specific stream segments or lakes located in that HUC. AUIDs may also be lakes or points, such as in the case of clearly defined and monitored bathing beaches or public water supply intakes.

Column 2 - Water Body Type - AUIDs can be beaches, rivers/streams, lakes, public water supply intakes, or shorelines.

Column 3 - n (number) - Number of daily geometric means that were used in the calculation of Column 4 (geometric mean of all data in each AUID). The data for all sites in an AUID are combined for the total number of daily geometric means.

Column 4 - Geometric mean of all *E. coli* data in each AUID (river segment, lake, or beach). Geometric mean of all available data within the AUID. This value is used for calculating column 5 (percent reduction) for informational purposes only but is not used in evaluating attainment status for assessment purposes. This number cannot be compared to the daily or 30-day water quality standard, since it contains data from more than one day and potentially more than one 30-day period. Data are only included if they meet the criteria of three or more individual samples during the same sampling event.

Column 5 - Percent Reduction - This value, provided for informational purposes, represents the amount of reduction that would be necessary for the geometric mean of all data (Column 4) to reach the 300 *E. coli* per 100 milliliter (mL) daily threshold. Attaining this reduction does not necessarily mean that the water body will be removed from the TMDL. The assessment methodology contained in the most recently approved Integrated Report determines the criteria

for removal of a water body from the impairment status. In some cases, the percent reduction is not provided because the geometric mean in Column 4 was less than the 300 *E. coli* per 100 mL daily threshold. In all cases, the water quality goal is to meet the threshold for removal of the impairment using the assessment methodology in the most recently approved Integrated Report.

Column 6 - Number of 30-Day Geometric Means - Number of 30-day geometric means that were calculated and used in the calculation of Column 7 (Percent 30-Day Exceedance). If 30-day geometric means were not calculated when the data were submitted to the Department of Environment, Great Lakes, and Energy (EGLE), then this value may be 0.

Column 7 - Percent 30-Day Total Body Contact (TBC) Exceedance - Percent of available 30-day geometric means (Column 6) that are exceeding the threshold of 130 *E. coli* per 100 mL. If only one 30-day geometric mean is available, this value will be 0 or 100%.

Column 8 - Percent Daily TBC Exceedances - Percent of daily geometric means ("n," Column 3) that exceed the 300 *E. coli* per 100 mL threshold.

Column 9 - Percent Partial Body Contact Exceedance - Percent of daily geometric means ("n," Column 3), that exceed the 1,000 *E. coli* per 100 mL threshold.

Column 10 - Interstate Waters - Inland waters that flow directly in or out of Michigan, from other states, are flagged with the direction of flow and the state involved; for example, waters marked "From Indiana" leave Indiana and enter Michigan. Waters are only flagged if EGLE has evidence of an impairment that extends to our border.

Column 11 - Code - This column contains notes that are unique to the water body:

> Data: The summary for this water body is based on a small dataset (n < 5) but is supported by a larger dataset (n > 5) from a nearby contiguous and comparable AUID.
>
> Declining WQ (Water Quality): These water bodies, typically beaches, have large datasets where older data show few exceedances of the WQS, but newer data show an impairment according to the most current Assessment Methodology in the Integrated Report.
>
> Raw Sewage: Water bodies are listed as impaired based on the presence of raw sewage in surface water.
>
> Reissue: This water body is already in a United States Environmental Protection Agency (USEPA) approved *E. coli* TMDL, and that TMDL is being revoked and reissued. Once this TMDL or Addenda is approved by the USEPA, this water body will be part of the statewide TMDL.

Column 12 – Cycle First Listed - This column contains the Integrated Reporting cycle year where the water body was first listed as not attaining the TBC designated use. Each biennial submittal of the Integrated Report contains a description and guidance on data requirements to list an AUID as impaired.

2018 Addendum to the Statewide E. coli Total Maximum Daily Load.

EGLE

Column 1: Assessment Unit	Column 2: Type	Column 3: n	Column 4: Geometric Mean (E. coli)	Column 5: % Reduction	Column 6: # of 30-Day Geometric Means	Column 7: % 30-day TBC Exceedance	Column 8: % Daily TBC Exceedance	Column 9: % Daily PBC Exceedance	Column 10: Interstate Waters	Column 11: Code	Column 12: Year 1st Listed
Watershed	**04050001**			**St. Joseph**							
Subwatershed	**040500010105**		**Marble Lake**								
040500010105-04	River	5	695	56.8%	1	100%	100%	20%			2018
Subwatershed	**040500010108**		**Mud Creek**								
040500010108-01	River	9	291		1	100%	56%	0%			2018
Subwatershed	**040500010109**		**South Branch Hog Creek**								
040500010109-01	River	9	554	45.9%	1	100%	78%	22%			2018
Subwatershed	**040500010201**		**Beebe Lake-Beebe Creek**								
040500010201-01	River	9	305	1.6%	1	100%	44%	22%			2018
Subwatershed	**040500010302**		**Mud Creek-Nottawa Creek**								
040500010302-01	River	4	277		0		50%	0%		Data	2018
Subwatershed	**040500010304**		**Pine Creek**								
040500010304-02	River	9	401	25.1%	1	100%	78%	0%			2018
Subwatershed	**040500010306**		**Nottawa Creek**								
040500010303-01	River	5	372	19.4%	1	100%	60%	0%			2018
040500010306-03	River	5	372	19.4%	1	100%	60%	0%			2018
Subwatershed	**040500010504**		**Butternut Creek-Bear Creek**								
040500010504-01	River	5	280		1	100%	40%	0%			2018
Subwatershed	**040500010505**		**Indian Lake-Portage River**								
040500010505-04	River	5	839	64.3%	1	100%	100%	40%			2018
Subwatershed	**040500010506**		**Portage River**								
040500010506-05	River	5	790	62.0%	1	100%	100%	40%			2018

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Subwatershed	040500010602		Middle Flowerfield Creek								
040500010601-01	River	5	246		1	100%	20%	0%			2018
040500010602-01	River	9	284		1	100%	22%	11%			2018
Subwatershed	040500012603		Lake Chapin-St Joseph River								
040500012603-02	River	21	62		17	18%	10%	5%			2018
Watershed	04050002		Black-Macatawa								
Subwatershed	040500020302		Headwaters Pigeon River								
040500020302-03	River	5	2,923	89.7%	1	100%	100%	60%			2018
Subwatershed	040500020402		South Branch Macatawa River								
040500020402-01	River	14	971	69.1%	2	100%	86%	36%			2018
Watershed	04050003		Kalamazoo								
Subwatershed	040500030507		Gull Creek								
040500030507-01	River	32	87		0		16%	0%			2018
Subwatershed	040500030904		Schnable Brook								
040500030904-02	River	5	811	63.0%	1	100%	100%	40%			2018
040500030904-03	River	5	811	63.0%	1	100%	100%	40%			2018
040500030904-04	River	5	811	63.0%	1	100%	100%	40%			2018
Watershed	04050004		Upper Grand								
Subwatershed	040500040601		Headwaters Looking Glass River								
040500040601-01	River	5	1,476	79.7%	1	100%	100%	80%			2018
Subwatershed	040500040602		Howard Drain-Looking Glass River								
040500040602-01	River	18	1,435	79.1%	3	100%	94%	50%			2018
Subwatershed	040500040603		Kellog Drain-Looking Glass River								
040500040603-02	River	6	2,016	85.1%	1	100%	100%	100%			2018
040500040603-03	River	5	2,494	88.0%	1	100%	100%	100%			2018

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Subwatershed	040500040604	Buck Branch-Vermillion Creek									
040500040604-01	River	12	1,031	70.9%	2	100%	92%	75%			2018
040500040604-02	River	5	1,392	78.4%	1	100%	100%	80%			2018
Subwatershed	040500040605	Vermillion Creek									
040500040605-03	River	12	960	68.8%	2	100%	100%	50%			2018
Subwatershed	040500040606	Leisure Lakes-Looking Glass River									
040500040606-02	River	5	4,400	93.2%	1	100%	100%	100%			2018
Subwatershed	040500040607	Mud Creek-Looking Glass River									
040500040607-01	River	10	1,147	73.8%	1	100%	100%	60%			2018
Subwatershed	040500040608	Remey Chandler Drain									
040500040608-01	River	8	69		1	100%	38%	0%			2018
Subwatershed	040500040609	Turkey Creek Drain-Looking Glass River									
040500040609-01	River	12	1,190	74.8%	2	100%	100%	50%			2018
040500040609-03	River	6	711	57.8%	1	100%	100%	17%			2018
Watershed	04050005	Maple									
Subwatershed	040500050203	Nile Drain-Bear Creek									
040500050203-01	River	6	1,542	80.5%	0		100%	50%			2018
Subwatershed	040500050204	Ferdon Creek-Maple River									
040500050204-01	River	6	2,342	87.2%	0		100%	67%			2018
Watershed	04050006	Lower Grand									
Subwatershed	040500060509	East Branch Rush Creek									
040500060509-01	River	5	1,010	70.3%	1	100%	100%	20%			2018
040500060509-02	River	5	1,010	70.3%	1	100%	100%	20%			2018
Subwatershed	040500060511	Rush Creek									
040500060511-01	River	5	780	61.6%	1	100%	80%	20%			2018

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Watershed	04060102			Muskegon							
Subwatershed	040601020103		Backus Creek								
040601020103-01	River	10	114		2	50%	0%	0%			2018
Subwatershed	040601020104		Houghton Lake								
040601020104-01	River	5	528	43.2%	1	100%	100%	0%			2018
Subwatershed	040601020304		Cunnerson Creek-Clam River								
040601020304-01	River	5	222		1	100%	20%	20%			2018
Subwatershed	040601020305		Mosquito Creek								
040601020305-05	River	5	253		1	100%	40%	0%			2018
Subwatershed	040601020306		Taylor Creek-Clam River								
040601020306-01	River	5	177		1	100%	20%	0%			2018
Subwatershed	040601020309		West Branch Clam River								
040601020309-01	River	5	278		1	100%	20%	0%			2018
040601020309-02	River	9	221		1	100%	22%	11%			2018
Subwatershed	040601020805		Weatherby Drain-Tamarack Creek								
040601020804-01	River	5	1,317	77.2%	1	100%	100%	40%			2018
040601020805-01	River	10	1,007	70.2%	2	100%	100%	30%			2018
Subwatershed	040601020809		Tamarack Creek								
040601020809-01	River	5	421	28.7%	1	100%	100%	0%			2018
Subwatershed	040601020903		Penoyer Creek-Muskegon River								
040601020903-03	River	14	173		2	100%	29%	0%			2018
Watershed	04060103			Manistee							
Subwatershed	040601030208		Manton Creek-Manistee River								
040601030208-04	Beach/Launch	169	56		116	12%	9%	1%			2018

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Watershed	04060105			Boardman Charlevoix							
Subwatershed	040601050705	East Branch Mitchell Creek									
04060105 0705-01	River	128	265		82	78%	52%	9%			2018
Watershed	04070002			Carp-Pine							
Subwatershed	040700020307	Rabbit Back Creek-Frontal Lake Huron									
040700020307-04	Beach/Launch	80	24		48	10%	8%	4%			2018
Watershed	04080101			Au Gres-Rifle							
Subwatershed	040801010105	Tawas River									
040801010105-02	River	19	403	25.6%	11	100%	58%	32%			2018
Watershed	04080103			Pigeon-Wiscoggin							
Subwatershed	040801030301	Headwaters Pinnebog River									
040801030301-01	River	12	233		0		50%	17%			2018
Subwatershed	040801030405	Bird Creek									
040801030405-01	River	5	521	42.4%	1	100%	80%	20%			2018
Subwatershed	040801030406	Baranski Drain									
040801030406-02	Beach/Launch	127	17		77	0%	2%	2%		Data	2018
Watershed	04080203			Shiawassee							
Subwatershed	040802030103	Cook Lake-South Branch Shiawasee River									
040802030101-01	River	5	167		1	100%	0%	0%			2018
040802030103-01	River	5	167		1	100%	0%	0%			2018
040802030103-02	River	5	167		1	100%	0%	0%			2018
Subwatershed	040802030105	Yellow River Drain at mouth									
040802030105-01	River	5	1,047	71.3%	1	100%	100%	20%			2018
040802030105-02	River	5	1,047	71.3%	1	100%	100%	20%			2018
040802030105-04	River	5	1,047	71.3%	1	100%	100%	20%			2018

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Subwatershed	040802030106	North Ore Creek									
040802030106-01	River	5	444	32.4%	1	100%	60%	20%			2018
Subwatershed	040802030108	Lake Ponemah-Shiawasee River									
040802030108-02	River	9	297		1	100%	56%	22%			2018
Subwatershed	040802030202	Kanause Lake Drain-Shiawassee River									
040802030202-01	River	9	1,441	79.2%	1	100%	89%	67%			2018
Subwatershed	040802030205	Scribner Drain-Shiawassee River									
040802030205-01	River	10	808	62.9%	0		80%	20%			2018
Subwatershed	040802030206	Osburn Drain-Shiawassee River									
040802030206-02	River	10	690	56.5%	2	100%	60%	40%			2018
Subwatershed	040802030207	Sawyer Drain-Shiawassee River									
040802030207-02	River	5	247		1	100%	20%	20%			2018
Subwatershed	040802030208	Mickels Creek-Shiawassee River									
040802030208-04	River	42	7		17	0%	5%	0%		Declining WQ	2018
Watershed	04080204	Flint									
Subwatershed	040802040505	Crawford Drain-Misteguay River									
040802040505-01	River	5	321	6.6%	1	100%	60%	0%			2018
Subwatershed	040802040506	Onion Creek-Misteguay River									
040802040506-01	River	6	484	38.0%	2	100%	100%	0%			2018
040802040506-03	River	6	208		2	100%	17%	0%			2018
Subwatershed	040802040507	Reed Drain-Misteguay River									
040802040507-01	River	10	438	31.5%	2	100%	60%	20%			2018
Subwatershed	040802040508	Northwood Creek									
040802040508-01	River	6	306	1.8%	2	100%	50%	0%			2018

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Watershed 04080205				Cass							
Subwatershed 040802050107	South Fork Cass River										
040802050107-01	River	9	820	63.4%	1	100%	67%	56%			2018
Subwatershed 040802050202	North Branch White Creek										
040802050202-02	River	9	1,802	83.4%	1	100%	78%	67%			2018
Subwatershed 040802050203	South Branch White Creek										
040802050203-02	River	9	609	50.7%	1	100%	78%	33%			2018
Watershed 04090004				Detroit							
Subwatershed 040900040102	Bell Branch										
040900040102-03	River	22	2,126	85.9%	17	100%	100%	82%		Reissue	2018
Subwatershed 040900040103	Upper River Rouge										
040900040103-05	River	21	1,899	84.2%	17	100%	95%	71%		Reissue	2018
040900040103-06	River	50	1,374	78.2%	30	100%	88%	68%		Reissue	2018
Subwatershed 040900040202	Tonquish Creek										
040900040202-03	River	23	1,423	78.9%	19	100%	91%	65%		Reissue	2018
Subwatershed 040900040303	Lower River Rouge										
040900040303-03	River	47	1,491	79.9%	39	100%	91%	64%		Reissue	2018
Subwatershed 040900040406	Ashcroft Sherwood Drain-River Rouge										
040900040406-02	River	28	1,440	79.2%	20	100%	82%	54%		Reissue	2018
Watershed 04090005				Huron							
Subwatershed 040900050102	Hayes Creek-Huron River										
040900050102-27	Beach/Launch	118	110		89	66%	23%	5%			2018
Subwatershed 040900050401	Fleming Creek										
040900050401-02	River	23	283		0		35%	17%			2018

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Subwatershed	040900050407		Huron River								
040900050407-02	River	75	143		14	86%	35%	7%			2018
Watershed	04100001			Ottawa-Stony							
Subwatershed	041000010201		Plum Creek								
041000010201-01	River	9	842	64.4%	1	100%	78%	22%			2018
041000010201-02	River	9	842	64.4%	1	100%	78%	22%			2018
Subwatershed	041000010204		Otter Creek								
041000010204-01	River	5	1,135	73.6%	1	100%	100%	20%			2018
Subwatershed	041000010205		Little Lake Creek-Frontal Lake Erie								
041000010205-03	River	5	1,825	83.6%	1	100%	100%	80%			2018
041000010205-04	River	5	1,825	83.6%	1	100%	100%	80%			2018
Subwatershed	041000010302		Halfway Creek								
041000010302-01	River	9	490	38.8%	1	100%	67%	22%	To/From Ohio		2018
041000010302-02	River	5	1,406	78.7%	1	100%	100%	40%	To Ohio		2018
041000010302-03	River	9	490	38.8%	1	100%	67%	22%			2018
Watershed	04100002			Raisin							
Subwatershed	041000020302		Baker and May Drain-Black Creek								
041000020302-01	River	4	582	48.5%	0		100%	25%		Data	2018
041000020302-03	River	5	157		1	100%	40%	20%			2018
041000020302-06	River	5	447	32.9%	1	100%	40%	20%			2018
Subwatershed	041000020305		Gleason Brook-Black Creek								
041000020302-02	River	5	584	48.6%	1	100%	40%	20%			2018
041000020305-01	River	5	584	48.6%	1	100%	40%	20%			2018
Subwatershed	041000020306		Big Meadow Drain-Black Creek								
041000020306-03	River	45	582	48.5%	0		84%	22%			2018

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Subwatershed	041000020410	Willow Run at mouth									
041000020410-03	River	14	656	54.3%	6	100%	79%	21%			2018