Appendix C

Total Maximum Daily Load Discussion

What is a TMDL?

A Total Maximum Daily Load (TMDL) is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards. TMDLs are governed by the Clean Water Act (CWA) under Section 303. More specifically, the EPA regulations define a TMDL as the sum of pollutant loads from point sources ("waste load allocations") and nonpoint sources ("load allocations").[1] Such loads shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety.

Water Quality Standard

A water quality standard on the other hand is based on use. It is either a narrative standard or numeric criteria set by states that focus on uses of the waterbody.[2] A narrative standard would be swimming or fishing. Setting numeric criteria states the allowable amount, or calculation, of a pollutant in the implementing regulation.[3] The use is then backed by calculations of pollutant loads which must be met in order to meet the designated use for a waterbody. Each entity that must discharge a categorized pollutant into a waterbody is able to discharge only a certain amount. This amount is known as its "allocation." The allocation of each industry or discharger is directed by a permit. Permits are guided by the National Pollution Elimination Discharge System (NPDES). New York State has its own federally-approved program known as the State Pollution Elimination Discharge System (SPDES). The process is governed by Article 17 of the Environmental Conservation Law (ECL) and administered by the New York State Department of Environmental Conservation (NYSDEC or DEC). The allowable amount of discharge outlined in a permit is informed by two main factors: Water Quality Standards (WQS) and effluent limitations.

Both WQS and effluent limitations are intended to limit the amount of a pollutant or effluent that enters a waterbody. A water quality standard states the intended use of a waterbody while an effluent limitation dictates the amount of a pollutant which may be loaded into a waterbody per discharger. An effluent limitation is the specified level of discharge reduction achievable by the best available technology ("BAT") through the use of Technology based effluent limits or ("TBEL") or other related standards for various sources of water pollution, such as a Water Quality Based Effluent Limitation ("WQBEL"). The intent of the TBEL is to require a minimum level of treatment of pollutants, for point source discharges, based on available treatment technologies, while allowing the discharger to use any available control technique to meet the limits. For industrial (and other non-municipal) facilities, technology-based effluent limits are derived from the following:

[1] 40 CFR § 130.2(i),(g) &(h)

[2] New York's Water Quality Standards can be found at: 6 NYCRR 703. Note, 6 NYCRR §§ 700-06 are currently under revision as of Nov. 2016, per federally mandated triennial review requirements. Specific information on each section under revision is available on NYSDEC's website.

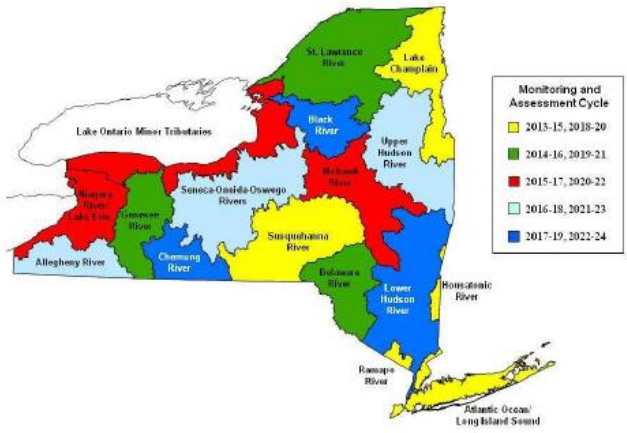
[3] *National Pollutant Discharge Elimination System (NPDES) Permit Writers' Manual*, U.S. ENVTL. PROTECTION AGENCY (Sept. 2010), https://www.epa.gov/sites/production/files/2015-09/documents/pwm_chapt_05.pdf.

- Using national effluent limitation guidelines and standards established by the EPA, and/or
- Using best professional judgement on a case-by-case basis in the absence of national guidelines and standards.
- For municipal facilities (publicly owned treatment works or POTWs), technology-based effluent limits are derived from national secondary treatment standards.
- Chapter 5 of the U.S. EPA NPDES Permit Writers' Manual (PDF) provides overview of the process for establishing technology-based effluent limits.[4]

How to Set a TMDL

A TMDL on the other hand is a calculation of the total amount of pollutants that an entire waterbody, or a delineated segment of a waterbody, can sustain. In short, water quality standards are guided by use. Effluent Limits apply to each physical discharger and TMDLs apply to the waterbody receiving the pollutants. Under the Clean Water Act, States are required to test their waters and report the findings on impaired waters to the EPA. Under Section 305 of the Clean Water Act, New York monitors all 690,000 acres (not including the Great Lakes) of freshwater and over 400 miles of Great Lakes coastline. The Clean Water Act Section 303(d) list is a subset of the total list of waterbodies that do not meet water quality standards. These water bodies are considered "impaired." The state maintains a list of impaired waterbodies, known as the 303(d) list. New York State regularly monitors the health of the state's waterbodies by utilizing a rotating basin schedule for testing. Through this system, the state is able to test all the waters of the state on a five-year schedule. [5]

Statewide Monitoring and Assessment Schedule



This five year testing process is guided by the Consolidated Assessment and Listing Methodology (CALM) process. Note, the Rotating Integrated Basin Studies (RIBS) program is the mechanism through which the testing is done and the data resulting from RIBS testing can be used to inform assessments of the CALM Process.

[4] ENVIRONMENTAL PROTECTION AGENCY, NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) http://water.epa.gov/polwaste/npdes/basics/Water-Quality-and-Technology-Based-Permitting.cfm-

New York then submits its list of impaired waters to the EPA every five years. It is important to note that not all impaired waterbodies are on the 303(d) list. The list includes only those waterbodies that cannot meet their designated uses and may require a TMDL to be set in order to lessen the amount of priority pollutants going into the waterbody. Specifically, there are three categories of impaired waters that are not listed on the 303(d) list:

- Category 4a Waters - TMDL development is not necessary because a TMDL has already been established for the segment/pollutant.
- Category 4b Waters - A TMDL is not necessary because other required control measures are expected to result in restoration in a reasonable period of time.
- Category 4c Waters - A TMDL is not appropriate because the impairment is the result of pollution, rather than a pollutant that can be allocated through a TMDL.

These examples show the potential flexibility of the system. Allowable alternatives exist to meet the metrics set by New York State. The sections below outline some of the hurdles with TMDL implementation and provide examples where a process other than a TMDL was successfully utilized. [6]

TMDL Mechanics

A. Cost: What is the cost of implementing a TMDL?

Setting, monitoring and maintaining a TMDL can be cost prohibitive. A 1995 study conducted by the EPA compared fourteen case studies on the cost of TMDL implementation. Project implementation costs ranged from: $4,039 to $1,023,531. Adjusted for inflation this would be $6,220- 1.58 Million in 2015. These costs were affected by a number of factors outlined below.[7] The study found the following to be the major factors affecting cost:

a. Modeling and data collection/monitoring are, on average, the most costly components of developing a TMDL
b. Types of waterbody and geographic features
c. Complexity of the water quality problem
d. Number and type of pollutants
e. Availability of data
f. Complexity of the model used
g. Number and Type of sources
h. Political sensitivity & level of public involvement

[6] NYS Consolidated Assessment and Listing Methodology, 16 (May 2009).

[7] *NYS Section 303(d) List of Impaired/TMDL Waters*, N.Y. ST. DEPT'T ENVTL. CONSERVATION. (last visited June 13, 2017), http://www.dec.ny.gov/chemical/31290.html.

The cost of implementing a large-scale TMDL can be significant but is generally spread amongst a number of dischargers and producers. The cost can be borne by a municipality and thereby passed onto the consumer. The Long Island Sound is an example of a costly, large-scale implementation. In that instance, the TMDL analysis for Dissolved Oxygen alone cost $650 Million for Point Source Treatment. This figure is markedly less than the $2.5 billion needed for the full Limit of Technology (LOT) alternative; the most comprehensive and stringent alternative presented in the Long Island Sound case study. The total cost of implementation can be defrayed by the different control technologies and spread across agencies and polluters. The changes suggested by the above example included ways to reduce nitrogen and in-water sources of pollution. Control measures for these included, $250 million for boat based alterations and $500 million - $1 Billion dollars to introduce gates to reduce tidal flow. The Long Island Sound serves as one small example of the exorbitant cost that can be associated with implementing a large TMDL. To make implementation feasible, the cost was broken down into its component parts and spread across the cost of individual control technologies for each producer. Specifically, boat owners would be responsible for boat based alternations, whereas the Department of Transportation took on the cost of gates to reduce tidal flow.[8]

B. Duty: When a state doesn't set a TMDL

Under the Federal Clean Water Act, States have a mandatory duty to monitor the water bodies of their state. If a state finds that a waterbody is impaired, they have a duty to consider a TMDL or other strategy to reduce the inputs of pollutants into a state waterbody. What if a state does not set a TMDL for a waterbody listed on the Section 303(d) list as "Impaired"? For example, the Niagara River and some of the tributaries in the watershed have been listed for up to ten years, yet no TMDL has been implemented. The Clean Water Act does not expressly address what duty, if any, the EPA bears under such circumstances.[9]

In New York, The District Court for the Southern District has grappled with this issue. Courts have read into the Act a requirement that EPA treat such state inaction, when the state does not set a TMDL or take other action to offset pollution loadings, as a so-called "constructive submission" of a deficient TMDL. [10] This triggers the EPA's explicit mandatory duties under the Act to disapprove the "submission," and to establish TMDLs for the state.[11]

[8] U.S. ENVTL. PROTECTION AGENCY, TMDL DEVELOPMENT COSTS ESTIMATES: CASE STUDIES OF 14 TMDLS 23 (MAY 1996)

http://www2.bren.ucsb.edu/~keller/courses/esm223/tmdl_cost.pdf

[9] See Clean Water Act § 303(d); 33 U.S.C §1311(d)

[10] *See* Clean Water Act § 1313(d)(2),

[11] *Nat. Res. Def. Council, Inc. v. Fox*, 909 F.Supp. 153, 157 (S.D.N.Y. 1995).

The Court above found that under the Act, the EPA retains discretionary authority, clearly stating that NY's failure to act would *eventually* trigger the EPA's duty under to Act to declare a constructive submission, thus having to set a TMDL. However, the Court made clear that there is no required timeline within which the EPA must act. The Court had found that although the waterbody has been listed for ten years the EPA was within is discretionary duty because the CWA does not require the EPA to take such action by a date certain or within a particular time frame. Thus, the court concluded that it was not yet required to find a constructive submission. Therefore, the EPA was not yet required to step in and set a TMDL due to state of New York inaction.[12]

C. Alternatives to Setting a TMDL

When a TMDL has not been set, and the State of New York courts have shown that the EPA must act, there is no set deadline within which they must do so. There are, however, feasible alternatives. As noted above, the Clean Water Act provides other means that can limit pollutant loadings. New York State sought to delist two water bodies by showing how implementing alternate control measures were sufficient. First, New Yorkers have utilized voluntary consent decrees. To address CSO issues in New York City and impairments to fish consumption in the upper reaches of the Hudson River, a consent decree was agreed upon between the NYSDEC and the New York City Department of Environmental Protection. A second example utilized dredging of sediments to show the EPA that other means to meet water quality standards were feasible. In both cases the EPA agreed that the implementation of a TMDL in light of the other control measures implemented would provide little additional value. However, leery of whether alternate control measures would be sufficient, the EPA would not delist the above water bodies or segments of water bodies. Instead, the parties reached a compromise. The EPA is allowing NYS to implement alternative control measures at both sites but the sites are remaining "listed" under Part 3c, "Waterbodies for which TMDL Development May be Deferred Pending Implementation/Evaluation of Other Restoration Measures." This compromise enabled New York to test alternative remediation techniques while still allowing the EPA oversight to reevaluate the waters and implement a TMDL should the alternative approaches be ineffective.[13]

Foreseeable Challenges

There are a number of other hurdles that can prevent the effective implementation of a TMDL. These can include cost, as discussed above, as well as the type of waterbody and pollutant sources. For example, the nature of a waterbody can make identifying pollutant loadings exceedingly difficult.

[12] *Id.*

[13] N.Y. ST. DEPT. ENVTL. CONSERVATION, NEW YORK STATE CONSOLIDATED ASSESSMENT AND LISTING METHODOLOY. (MAY 2009).

The Niagara River for example is deep, fast flowing and leads to Niagara Falls. Moreover, not only do the physical attributes of the river make pin pointing what pollutants are stemming from what sources difficult, but it is further complicated because it is an international waterbody. The American Federal law cannot regulate foreign sources. How can pollutants be regulated such that a waterbody can be rehabilitated when the law only applies to half the sources? In addition, sources of loadings may come from nonpoint sources. These are sources of pollutants that are not as easily discernable as the end of a pipe, for example nutrient run off from farmland, or pollutants entering waterbodies from impervious surfaces, such as road salt from highways. Since these sources are not regulated under the Clean Water Act, and the quantities and precise source location can be difficult to identify, they cannot be regulated using the CWA and would not fall under pollutants that must be limited by a TMDL.

Nine-Element Watershed Plans

For comparison, the paragraphs below will briefly explain the mechanics of a nine element Watershed Plan or 9e Plan and how it may be different than a state-implemented TMDL. The New York State Dept. of Environmental Conservation highlights the similarities by explaining that both TMDLs and nine element watershed plans are watershed-based plans that identify and quantify sources of pollutants and set pollution reduction targets needed to meet water quality goals. In fact, TMDLs and 9(e) plans are almost interchangeable, however, there are a couple of key differences. See the chart on next page.[14]

First, the New York State Department of State funds the development of watershed plans through the Environmental Protection Fund. Whereas a municipality, state agency or private actors are often the funding sources for TMDL implementation, the 9(e) plan focuses on tapping a larger array of public funding options. For example, the Black River Watershed Plan development was funded by NYSDEC. That watershed plan lists potential funding options to implement a 9(e) plan. The funding sources and alternatives proposed include state and federal grants, organized into agriculture and non- agriculture Nonpoint source funding opportunities as well as Natural Resource Conservation Service programs, regional opportunities and Wastewater infrastructure funding options.[15]

[14] *Nine Element Watershed Plans*, N.Y. ST. DEP'T ENVTL CONSERVATION (last visited June 13, 2017), http://www.dec.ny.gov/chemical/103264.html.

[15] N.Y. ST. DEP'T ENVTL. CONSERVATION, BLACK ROCK NINE ELEMENT WATERSHED MANAGEMENT PLAN, APPENDIX II (June 3, 2016). Available at http://www.dec.ny.gov/docs/water_pdf/9eblackriver.pdf.

Comparison of 9E plans and TMDLs		
Attribute	**9E Plan**	**TMDL**
Pollutant sources	Better for nonpoint sources	Better for point sources
Implementation plan	Required	Optional*
Public comment period	No (public participation is conducted throughout plan development)	Required
Agency approval	NYS DEC	EPA
Funding eligibility	State and federal opportunities	State and federal opportunities

Another critical difference is the inclusion of quantifiable reductions in pollutants. Such a calculation is a required element of a TMDL but does necessarily have to be included in a 9(e) plan.

The 9(e) Plan elements are:

A. Identify water quality target or goal and load reductions needed to achieve goal;
B. Identify the best management practices (BMPs) that will help to achieve reductions needed to meet water quality goal/target;
C. Describe the financial and technical assistance needed to implement BMPs identified in Element C;
D. Describe the outreach to stakeholders, how their input was incorporated, and the role they then played to implement the plan;
E. Estimate a schedule to implement BMPs identified in plan;
F. Describe the milestones and estimated time frames for the implementation of BMPs;
G. Identify the criteria that will be used to assess water quality improvement as the plan is implemented; and
H. Describe the monitoring plan to collect water quality data to measure water quality improvement against criteria in H.

While a TMDL and a 9 element plan may be similar, their creation, focus, and implementation can vary. The TMDL is outlined in federal statutes and implemented by states. The 9(e) Plan is bolstered

by the NYSDEC and while it can be difficult to meet all 9 elements and require a very detailed level of analysis, it can potentially be funded by a broader array of sources.

Suggested Conclusions

Some of the smaller tributaries that Riverkeeper sampled and collected data are listed on the 303(d) list such as: Tonawanda Creek, Bowen Creek, Black Creek, Ransom Creek and Gott Creek. For these more manageable waterbody or waterbody segments, a TMDL could be a viable option provided there is an entity to bear the cost of implementation and oversight. For larger bodies of water, such as the Niagara River itself, however, a TMDL may not be the most efficient or cost effective solution. As with the cases noted above, the Niagara River is extremely large and plagued with numerous different types of pollutants from varying sources. It has been on the 303(d) list for about a decade and NYS has yet to set a TMDL. As case law has shown, the EPA does not have a predetermined time limit denoting when they must step in on behalf of the state.

Furthermore, in order to have a waterbody removed from the 303(d) list through alternate means, the applicant must show that, "Delisting of a previously listed water *prior* to the development of a TMDL can occur only if: (1) The water is shown to be meeting all applicable water quality standards, or (2) If, upon re-examination, the original basis for listing the water is determined to be inaccurate."[16] If a waterbody requires a segment specific TMDL and that TMDL is under development by NYSDEC, or scheduled for future development by NYSDEC, an alternate strategy may be developed. Specifically, according to New York State guidance document, "If an alternative strategy other than a TMDL is identified as appropriate to address waterbody impairments, then that waterbody may be considered for delisting to IR Category 4(b)." A 4(b) delisting is a powerful tool, for it pulls the decision making authority from the top and puts it at a more local level, where water quality attainment goals can be achieved through cooperative agreements and best management practices.

Therefore, the most plausible solution for the Niagara River may be to limit the amount of pollution through best management practices implemented at the local level. This option is particularly feasible because New York is a Home Rule state which means local municipalities can create and enforce laws regarding property at the local level.[17] The Niagara River, or any of the smaller tributaries that are listed, could be delisted to IR Category 4(b) and then meet the water quality goals through identifying and implementing an alternate strategy.

[16] *See* NYS CONSOLIDATED, *supra* note 11.

[17] *See generally* N.Y. MUN. HOME RULE LAW; ART. IX NYS CONST.