

Notes for the December 11, 2020 meeting about the proposed nutrient criteria for Class AA, A, B, and C waters (Chapter 583)

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Participants

Name	Organization
Andy Wendell	Clearwater Laboratory
Bill Taylor	Pierce Atwood
Brad Sawyer	Maine Rural Water Association
Bruce Berger	Maine Water Utilities Association
Curtis Bohlen	Casco Bay Estuary Partnership
Dan Kusnierz	Penobscot Indian Nation
David Courtemanch	Nature Conservancy
Doug Roncarati	City of Portland
Francis Brautigam	ME IFW Augusta
Gordon Lane	SD Warren - Westbrook
Jason Sockbeson	Maine Rural Water Association
Jeff Saucier	McCain Foods
Julie Ann Smith	Maine Farm Bureau
Julie-Marie Bickford	Maine Dairy Industry Association (MDIA)
Matt Demers	MEWA
Nate Whalen	Portland Water District
Nick Bennett	NRCM
Rebecca Graham	Maine Municipal Association
Robert Nedeau	SAPPI - Somerset
Sarah Haggerty	Maine Audubon
Scott Firmin	Portland Water District
Susan Davies	Maine Rivers
Susan Gallo	Maine Lakes Society
Tim Wade	Greater Augusta Utility District
Toby Stover	U.S. EPA Region 1
Todd Langevin	IF&W - Hatcheries
Tony Jenkins	Natural Resource Conservation Service
Williss Emmons	Maine Rural Water Association

Brian Kavanah and Don Witherill of Maine DEP opened the meeting and provided a quick introduction to [Chapter 583](#). Chapter 583 is a water quality rule that would add nutrient criteria to water quality standards for Class AA, A, B, and C waters of the State of Maine. Tom Danielson of Maine DEP gave a [presentation](#) about the nutrient criteria, a decision framework for determining attainment of nutrient criteria, a process for setting site-specific criteria, and guidelines for listing impaired waters. Tom also talked about some implementation issues that are not part of Chapter 583 but could be influenced by the draft rule if it was adopted. Following the presentation, DEP staff answered questions from participants. Most of the questions were not about Chapter 583. Rather, most questions were about how the changes to water quality standards could impact implementation of wastewater discharge licenses, municipal stormwater permits, and agricultural programs.

Questions about Chapter 583

Q. Why is sampling restricted to August?

A. Water quality sampling would typically be done June 1 – September 30 and is not restricted to August.

Q. Would farming be considered a naturally occurring discharge?

A. No

Q. Tom, do you have any further comments about Independent Application for impairment listings? Would a stream where biocriteria for algae is non-attainment, and other response indicators for nutrients are also impaired, would it be listed for both non-attainment of aquatic life use and nutrient criteria non-attainment?

A. Yes, it is possible that a waterbody could be listed for both nutrient criteria and another criterion, such as aquatic life criteria or dissolved oxygen criteria. We don't expect to see large increase in impaired waterbody listings, since we have already been implementing many of the response indicators.

Comments of support - Toby Stover (U.S. Environmental Protection Agency) said that the U.S. EPA supports the draft rule. Several other participants expressed support of the combined criteria (TP and response indicators) over the use of criteria based only on TP.

Q. How many times would a site need to be in non-attainment before it would be considered impaired?

A. It really depends on the severity of non-attainment conditions. In some circumstances, the Department could decide to list a waterbody on the 303(d) list as impaired based on a single year of samples. However, the Department often is cautious and resamples a waterbody to confirm

attainment status before listing a waterbody as impaired (Category 4 or 5). In some circumstances, the Department has the option of listing a waterbody as Category 3 when there is insufficient data and information to determine if designated uses are attained (with presumption that one or more uses may be impaired). The process of listing waterbodies as impaired is discussed more in section 5 of [the report that describes the nutrient criteria](#), which is from the 2016 Integrated Report.

Q. Who could initiate and pay for a study to establish site-specific criteria?

A. A site-specific study could be initiated and paid for by DEP or another organization. DEP probably will not have the staff and resources to meet all demands, so Chapter 583 allows other organizations to conduct a study.

Q. Given the response from Tom that site-specific monitoring of response indicators will primarily be the responsibility of DEP staff, are current and future expected federal and state funding levels adequate to collect the needed environmental data for permitting? Will there be any increase in monitoring funds or staffing levels?

A. Don - Funding is tight, nothing on horizon for staff increases at this time. Future demand for site specific monitoring and future funding are unpredictable. Brian K - If we cannot handle demand, may end up being responsibility of discharger.

Q. How much would it cost to do a site-specific study?

A. Sampling effort might vary from once a month (June through September) to once a week depending on the situation. Assuming that sampling is once a month, DEP estimates that lab and taxonomic analysis would cost approximately \$2,000/year. It would require approximately 14 hours of labor for two trained personnel to conduct the sampling. If an organization hired a contractor to do the work, then there could be additional hours for planning and writing up the results. This is a rough estimate and the ultimate price would vary depending on multiple factors, such as the frequency of sampling, travel distance, contractor fees, laboratory analytical costs.

Estimated cost to sample a wadable stream*

* In some circumstances, DEP may require more frequent sampling

Parameter	June	July	August	September
Macroinvertebrate bioassessment (rock bags)		Drop off rock bags	Retrieve rock bags	
Macroinvertebrate sorting and identifying			✓ (\$1,000)	
Algal bioassessment (rock scrapings)		Collect rocks and brush algae off of them		
Subcontract algal taxonomy		✓ (\$350)		
Viewing bucket survey (looking at algae on the stream bottom at 9 spots)	✓	✓	✓	✓
Water quality meters (DO, conductivity, pH, temperature)	✓	✓	✓	✓
Keeping an eye out for sewage fungus while doing the other work	✓	✓	✓	✓
Water grab samples (Chl <i>a</i> , TP, O-PO ₄) *	✓ (\$155 lab cost)	✓ (\$155 lab cost)	✓ (\$155 lab cost)	✓ (\$155 lab cost)
Estimated time for a crew of 2 people to do all of the sampling	1 hour	1 ½ hours	2 hours	1 hour
Average total travel time	2 hours	2 hours	2 hours	2 hours

* Additional water quality parameters could be added to the sampling plan, such as various forms of nitrogen.

Estimated cost to sample a deep river or impoundment with a boat

* In some circumstances, DEP may require more frequent sampling

Parameter	June	July	August	September
Macroinvertebrate bioassessment (rock bags or cones)		Drop off rock bags or cones	Retrieve rock bags or cones	
Macroinvertebrate sorting and identification			✓ (\$1,000)	
Secchi disk transparency (if the water is not flowing much)	✓	✓	✓	✓
Water quality meters (DO, conductivity, pH, temperature)	✓	✓	✓	✓
Keeping an eye out for sewage fungus while doing the other work	✓	✓	✓	✓
Epilimnetic core water samples (chlorophyll <i>a</i> , TP, and O-PO ₄)*	✓ (\$155 lab cost)	✓ (\$155 lab cost)	✓ (\$155 lab cost)	✓ (\$155 lab cost)
Estimated time for a crew of 2 people to do all of the sampling	1 hour	1 ½ hours	2 hours	1 hour
Average total travel time	2 hours	2 hours	2 hours	2 hours
Cost of using a boat	?	?	?	?

* Additional water quality parameters could be added to the sampling plan, such as various forms of nitrogen

Questions about reasonable potential analysis

The first stakeholder meeting included some discussion about reasonable potential (RP) analysis. State and Federal regulations require DEP permit writers to determine if a discharge to waters of the State of Maine could cause or contribute to non-attainment of water quality standards.

Chapter 583 focuses on water quality standards will not change the framework for how the DEP does RP analysis. However, the

U.S. Environmental Protection Agency informed DEP staff that they would need to use the TP

values in Chapter 583 (18 ppb for Class AA & A, 30 for Class B, and 40 for Class C) as the $TP_{discharge}$ in RP calculations.

Currently, DEP uses 100 ppb as an interim threshold for the $TP_{discharge}$ in RP calculations. (This 100 ppb interim threshold is based on an old EPA criterion that is no longer supported by EPA). Unrelated to Chapter 583, and based on

existing statutory authority at 38 M.R.S. Section 464.4.D, DEP intends to use August median flow as the $Q_{discharge}$ in RP calculations

instead of 7Q10, which is the lowest 7-day average that occurs (on average) once every 10 years.

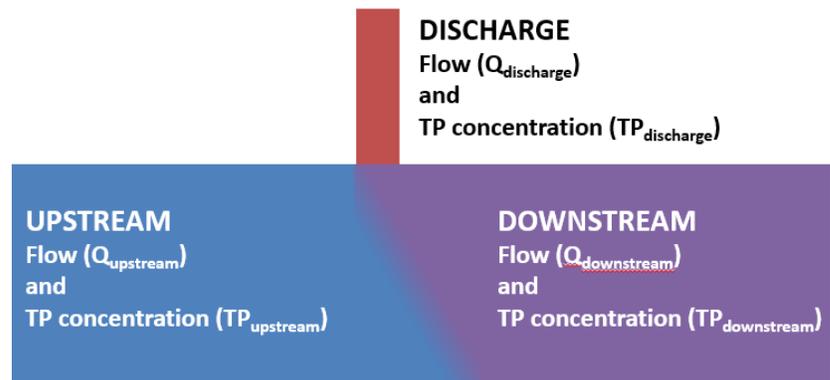
Depending on the river, August median typically equates to 3-5 times more water than 7Q10.

Some people commented that using August median flow would

be less protective than using 7Q10 in RP calculations, which is true. DEP previously debated between using 7Q10 and August median flow and decided to use August median flow because of the following reasons:

- phosphorus is not a toxic chemical,
- adding nutrients will not always lead to water quality problems because of other factors that may limit the growth of algae, and

RP Analysis



RP Calculations

$$\frac{Q_{discharge} TP_{discharge} + Q_{upstream} TP_{upstream}}{Q_{discharge} + Q_{upstream}} = TP_{downstream}$$

$Q_{discharge}$ = Maximum flow of the discharge allowed by permit

$TP_{discharge}$ = Average TP concentration of the discharge

$Q_{upstream}$ = Background stream flow

$TP_{upstream}$ = Maximum background in-stream TP concentration

$TP_{downstream}$ = Resultant downstream TP concentration

- it typically takes 10-21 days to form a bloom of algae floating in the water (phytoplankton) or filamentous algae growing on rocks.

While not the deciding factor, the choice of August median or 7Q10 flows would influence DEP's ability to conduct water quality studies to determine if site-specific values for TP or another nutrient are appropriate. With 7Q10, staff could only collect data, on average, once every 10 years. In contrast, staff could collect data every couple of years, on average, with August median flow. Several people voiced their concern of using 7Q10 and several people voiced support of August median flow.

Q. Will the rule would lead to an increase in laboratory analysis for total phosphorus and ortho-phosphorus.

A. Yes but not a large increase.

Q. Would the change to August median flow and the TP values from Chapter 583 result in additional facilities having issues with reasonable potential analysis?

A. Yes, approximately 8% of the 163 POTWs and several other commercial, state, and federal entities would have issues with reasonable potential under those circumstances. Some of those facilities already have issues with reasonable potential with the interim threshold of 100 ppb TP and 7Q10 flows. Some of those facilities already have phosphorus limits in their discharge licenses. DEP is contacting each facility with potential impacts from reasonable potential analysis individually to discuss potential impacts, implementation schedules, and funding options.

Q. Given that most agricultural activities are not licensed or permitted for discharges to State waters, would Publicly Owned Treatment Works (POTW) bear a disproportionate burden of lowering nutrient discharges?

A. There are various grant programs and voluntary best management practices that could reduce discharge of soil and nutrients to streams and rivers from agricultural activities. However, yes, the current regulatory framework places more direct regulatory controls on facilities with discharge licenses.

Q. How much information do we currently have on the response indicators across the state?

A. The Department has statewide information for all response indicators. The [report that describes Chapter 583](#) includes information about data.

How will Chapter 583 affect discharge permits, stormwater permits, and agricultural permits and activities?

The first stakeholder meeting included several questions about how Chapter 583 might affect implementation of wastewater discharges, municipal separate stormwater sewer systems (MS4), and agricultural permits and activities. Chapter 583 is a water quality rule for Class AA, A, B, and C waters and will not fundamentally change regulatory and non-regulatory programs related to discharge licenses, MS4 permits, and agriculture. Chapter 583 could affect permits in two ways. First, DEP permit writers would be required to use the TP values in Chapter 583 when evaluating reasonable potential of a discharge to cause or contribute non-attainment of water quality standards in a receiving water (Reasonable potential analysis is described in another part of this document). The purpose of the reasonable potential analysis is to prevent non-attainment of water quality standards by predicting the conditions under which non-attainment could occur and establishing permit limits to prevent this occurrence. The second way that Chapter 583 could affect permits is if a waterbody is listed as impaired due to the nutrient criteria. The act of listing a waterbody as impaired would not change the overall framework of regulatory and non-regulatory management but could result in implementation of new or more stringent nutrient limits to reduce nutrient enrichment and restore water quality in the receiving water.

	Without Chapter 583	After adopting Chapter 583
Water quality standards		
Dissolved oxygen	✓	✓ Same
pH	✓	✓ Same
Aquatic life (biomonitoring)	✓	✓ Same
Sewage fungus	✓	✓ Same
Secchi disk transparency		✓ New
chlorophyll a concentration		✓ New
% nuisance algal cover		✓ New
Regulatory requirements	✓	✓ Same framework. Individual permits might have new or more stringent limits if a waterbody does not attain nutrient criteria.
Non-regulatory programs	✓	✓ Same framework

So, will adopting Chapter 583 result in a large increase in the number of impaired waters? No. In terms of water quality standards, DEP predicts that Chapter 583 will not greatly increase the number of impaired waters. DEP already uses four of the seven nutrient response indicators when determining attainment of water quality standards, including dissolved oxygen, pH, aquatic life criteria, and sewage fungus. The process of identifying impaired waters due to dissolved oxygen, pH, aquatic life, or sewage fungus would not be changed by Chapter 583 and there would be no “new” listings caused by these indicators if Chapter 583 was adopted. There is still

value in incorporating those indicators into Chapter 583, however. Those four indicators can all be negatively impacted by nutrient enrichment. In addition, including them in Chapter 583 makes the entire process of determining attainment of water quality standards with respect of nutrient enrichment more comprehensive, predictable and transparent.

If adopted, Chapter 583 will formalize the use of three new indicators for Class AA, A, B, and C waters, including Secchi disk transparency, chlorophyll *a*, and % nuisance algal cover. Any “new” listings of impaired waterbodies would be from these three indicators. The Secchi disk transparency and chlorophyll *a* would have limited application to impoundments, ponds that are not classified as GPA waters, and slowly flowing portions of streams and rivers. The % nuisance algal cover would have limited application to wadable segments of rivers and streams with rocky substrate. As described in the [report describing the draft nutrient criteria](#), most streams identified as having problems with nuisance algae in the past 5 years are already listed as impaired for other reasons. In the past 5 years, DEP identified 2 waterbodies with problems with chlorophyll *a*. DEP would continue to take the lead on working with facilities and municipalities for discharge licenses and MS4 permits. In many cases, DEP can assist with identifying structural and non-structural best management practices, setting implementation schedules, and obtaining funding. DEP would continue to collaborate with the Department of Agriculture, Conservation, and Forestry for agricultural operations that are impacting water quality by causing non-attainment of criteria established by the nutrient rule.

In summary, Chapter 583 is a water quality rule and will not change the framework of existing regulatory and non-regulatory programs, permits, and licenses related to wastewater discharges, MS4s, and agriculture. The main changes could be more stringent nutrient limits associated with waterbodies that do not attain nutrient criteria. The real benefits of adopting Chapter 583 are to formalize how DEP will evaluate attainment of water quality standards with respect to nutrient enrichment, establish a process for setting site-specific nutrient criteria, and making the entire process more predictable and transparent.

Definitions and acronyms related to the draft nutrient rule

- “303d” Maine list of impaired waters
- “7Q10” The lowest 7-day average stream/river flow that occurs (on average) once every 10 years.
- “Algal bloom” means a growth of suspended algae in the water column that causes Secchi disk transparency to be less than 2.0 meters. Algal blooms usually are dominated by cyanobacteria; however they may also be dominated by other types of algae.
- “BPJ” Best Professional Judgment, often used in context related to the analysis on samples collected for aquatic life attainment assessments.
- “Chlorophyll *a*” means a particular kind of photosynthetic pigment of algae and plants.

- "Class" means the statutory goal (i.e., AA, A, B, C, GPA) assigned to a waterbody as established in Water Classification Program, 38 M.R.S.A. §§ 464(4), 465, 465-A, 467, and 468 for the purpose of protecting designated and existing uses.
- "Colored" means water having a mean apparent color >25 standard platinum units or equivalent value of true color or dissolved organic carbon.
- "CWA" Federal Clean Water Act
- "DACF" Maine Department of Agriculture, Conservation and Forestry.
- "DEP" Maine Department of Environmental Protection.
- "DO" refers to dissolved oxygen measurements.
- "Impounded waters" means riverine waters upstream of a dam and not classified as GPA where the surface elevation is essentially the same as found at the dam.
- "MEPDES" Maine Pollutant Discharge Elimination System.
- "M.R.S." Maine Revised Statutes.
- "MS4" municipal separate stormwater sewer systems.
- "NPDES" National Pollutant Discharge Elimination System.
- "Nutrient" means any chemical which an organism requires to live and grow. Nitrogen and phosphorus are important nutrients that frequently limit growth of aquatic organisms, especially primary producers, but the term includes many other essential and trace elements.
- "O-PO4" refers to ortho phosphate measurements.
- "POTW" means Publicly Owned Treatment Works.
- "Patches of fungi and filamentous bacteria" means visible growths of aquatic fungi or filamentous bacteria (e.g., sewage fungus), excluding iron and manganese bacteria.
- "Percent algal cover" means the amount of stream and river substrate covered by filamentous algae greater than 1 centimeters long or periphyton mats greater than 1 millimeter thick.
- "Periphyton" means a layer of microscopic algae, bacteria, and fungi growing on a substrate within a waterbody.
- "pH" means a measure of water acidity.
- "Phaeophytin" means a byproduct of chlorophyll degradation formed when chlorophyll loses its central magnesium molecule.
- "Phytoplankton" means algae suspended in the water column.
- "ppb" means parts per billion, which is equivalent to micrograms per liter ($\mu\text{g/L}$).
- "ppm" means parts per million, which is equivalent to milligrams per liter (mg/L).
- "Q" Stream/river flow, typically measured in cubic feet per second (cfs).
- "Secchi-disk depth" means a measurement of water clarity using a Secchi disk.
- TMDL - Total Maximum Daily Load.
- "TP" means total phosphorus.
- "Turbid" means that the water is not clear or transparent due to small organic and inorganic particles suspended in the water.
- "Type" means a kind of waterbody based on size, geomorphology, movement of water, and substrate type, such as pond, lake, wadable stream with rocky bottom, wadable stream with unconsolidated substrate, impoundment, and non-wadable river.

- “Water column chlorophyll *a*” means a measurement of the concentration of chlorophyll *a* in a water sample. It is an indicator of phytoplankton or algal blooms.