UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

Meeting Summary
Utah Water Quality Standards Workgroup
January 10, 2022

EPA Ambient Water Quality Criteria to Address Nutrient Pollution in Lakes and Reservoirs

Ms. Laidlaw provided an overview of the derivation of the EPA criteria. Ms. Hinman asked if the national models could be updated with additional data provided by states. Yes, EPA anticipates adding data to the national models as it becomes available including the data from the 2017 National Lakes Assessment. Adding any new data will take time. EPA anticipates providing guidance for how states should submit data.

Mr. Parrish asked if EPA will recommend minimum certainty and confidence limits for the criteria. EPA is currently drafting implementation guidance that is anticipated to provide general recommendations but specific recommendations are not anticipated. EPA's intent is to provide states with the tools to consider certainty and confidence so that these can be tailored to state-specific circumstances. The variability and uncertainty associated with the individual parameters may affect decisions regarding certainty and confidence. States should focus these evaluations on the variables that affect the criteria the most. EPA is working on a table of parameters intended to be a starting point for these evaluations. A draft of this table was shared with the workgroup. Considerations for deriving appropriate exceedance frequencies are provided in an appendix.

Ms. Kirschner asked if public comments would be solicited for the implementation guidance. EPA responded that an opportunity for public comment was expected but not required. After the meeting, Ms. Laidlaw confirmed that a 60-day public comment period. A draft was shared with ACWA (Association of Clean Water Administrators) for comment. Based on some of the feedback received from ACWA, EPA anticipates that states have questions that may be too specific to address in a national implementation guidance.

Mr. Parrish asked if DWQ identified any specific concerns regarding the criteria. Based on DWQ's review, technical bases for the criteria are sound but DWQ is still evaluating potential implementation issues. Utah does not routinely collect data for all of the parameters used to support the criteria which limits the ability to fully evaluate the applicability for Utah. DWQ supports the flexibility offered by being able to vary the certainty and confidence. DWQ will further evaluate the EPA criteria as part of the ongoing Utah Lake studies.

Ms. Laidlaw suggested carefully studying the models to be aware of the limitations. For instance, the zooplankton model isn't calibrated for oligotrophic systems.

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EPA (2018) Aluminum Criteria

Mr. Bittner provided an overview of DWQ's proposed recommendations for updating Utah's aluminum criteria (see supporting document). The Criteria Support Document was shared with the workgroup and comments are requested before the next workgroup meeting.

The workgroup discussed the adequacy of currently available monitoring data to support wasteload allocations. Specifically, if the mixing zone pH is routinely modelled and if hardness concentrations are based on a specific analytical method or estimated by summing calcium and magnesium concentrations. DWQ will verify the

procedures currently being implemented. Mr. Myers' suggested that dischargers be encouraged to collect site-specific mixing zone data. DWQ will need to provide guidance to permittees regarding analytical methods, sampling locations, frequency, and data submittal, etc. Permittee's don't usually conduct environmental sampling but may volunteer if there are benefits and the scope is clearly defined.

Ms. Kirschner inquired if EPA knew when the revised Technical Support Document for aluminum criteria implementation would be released and if revisions could affect Utah's proposed implementation. EPA does not have a release date scheduled. DWQ doesn't anticipate revisions to the support document that would change the recommendation for adopting the criteria. If workgroup members identify any specific concerns, they should be shared with DWQ.

Mr. Parrish noted that the proposed 3 years to fully implement the criteria exceeds the length of time EPA anticipated in the draft implementation guidance. DWQ recommends the 3-year transition period to provide an opportunity for dischargers to collect site-specific data needed to support accurate criteria determinations. Mr. Parrish recommended that DWQ provide justification for the 3-year duration. Workgroup members were invited to comment on the proposed 3-years to fully implement the criteria.

Dissolved Oxygen for early life-stages in Class 3A waters.

Mr. Bittner explained that the dissolved oxygen criteria for early life-stages (ELS) can be more stringent than saturation at certain elevation and temperature combinations (supporting document). Mr. Parrish asked if DWQ has considered applying the criteria only when cold water ELS are present. Ms. Hinman stated that ELS are considered present for assessments when site-specific data support their presence. Mr. Bittner said that ELS can be present in most months in Class 3A streams that also support cool water fish species.

Dissolved oxygen is a response variable for nutrient stress and any relaxation of these criteria must not obscure negative impacts of nutrients. Mr. Ostermiller supported that DWQ's headwater nutrient criteria provide a backstop for protecting against nutrient impacts. Severe nutrient impacts would also be detected by pH criteria exceedances and dissolved oxygen concentrations over 100 percent. Environmental respiration could potentially be monitored for high elevation receiving waters but this may beyond the capacities of small to medium-sized dischargers.

DWQ anticipates proposing a standards revision at the next meeting and workgroup members are encouraged to provide DWQ with specific recommendations.

Utah Lake Studies

Mr. Bittner gave a reminder that much progress is being made with the Utah Lake studies. Workgroup members will be provided an opportunity to review the criteria before it's recommended to the Water Quality Board. Workgroup members are encouraged to track the progress via information posted to web (see supporting document).

Next Meeting: April 18, 2022 1:00 PM

EPA Draft Guidance for Evaluating Lake and Reservoir Criteria Variability and Certainty

Model Assumptions

Model	Input Parameters	Proposed Regional Value	Rationale	Alternatives should be considered when….
Zooplankton https://nsteps.epa.gov/apps/chl-zooplankton/	Slope Threshold	>0.1	EPA's 304(a) criteria document notes that "In eutrophic lakes, however, increases in phytoplankton biomass often are not associated with an increase in zooplankton biomass, and the slope (ΔZ/ΔP) approaches zero (Leibold et al. 1997, Hessen et al. 2006, Heathcote et al. 2016)."[emphasis added] Therefore, the slope threshold should be set at values >0.1 to ensure the proposed chl-a criterion is not reflective of conditions that would not protect the designated use. If the use requires a higher relative rate of zooplankton production, a slope value at the higher end of the range is recommended.	Oligotrophic lakes (model slider is truncated to 0.4 slope threshold, below the oligotrophic cutoff); Mid-depth lakes with a higher slope threshold. Question re. # of shallow lakes in state datasets
	Depth		Apply to all 3 depth ranges.	
	Certainty level (CL)	If the state selects a more protective (higher) slope threshold, and chl-a concentrations are relatively stable across CLs,	The certainty level reflects how confident a state wants to be when making a decision. Higher certainty levels reflect greater confidence that the designated use will be protected. Additional considerations include: - Whether the chl-a values appear to	Limited number of valid outputs for mid-depth lakes at higher slope thresholds and higher certainty levels may not be representative of R8 lake conditions.

		Region 8 recommends a CL of 75% certainty or above. If a slope threshold near 0.1 is selected, EPA recommends a CL of 80% certainty or above.	be relatively "stable" across varying CLs. See table 1 in the appendix for details. - Permitting confidence levels are often set at 90%. Note that allowed exceedance at time of limit calculation should include understanding of the allowed certainty level in the criterion and additional conservatism may be necessary.	
Microcystin https://nsteps.epa.gov/apps/chl-microcystin/	Microcystin target concentration (ug/L)	0.3-8	0.3 ug/L is the EPA health advisory for drinking water for children <6 years old (assumes no treatment of raw surface water to drinking water, which may not be the case) 8 ug/L is the EPA recommended recreational value	Where other (non mc) cyanotoxins are at issue for designated use protection, they may have different relationships with e.g., biovolume, connection to TN and TP that are underpinnings of the models. Additional criteria development may be needed.

	Allowable Exceedance Frequency	0.01 <0.025 The allowable exceedance frequency should ensure the microcystin criterion will be achieved. Most R8 states only allow for 3 excursions in a single year which equates to ~33% of the summer recreational season as impacted by toxins.	As noted in the criteria document, "if our single day exceedance probability is 0.05, there is a 62% chance that we will observe greater than three excursions during a 100-day season (Figure 23)." R8 reviewed Figure 23 in the NLA document and evaluated the probability of excursions during a 10-day window for a 100-day season. Based on the predicted seasonal probability, an exceedance frequency of less than **0.03** is needed to meet the microcystin criterion for a 100-day recreational season applied in a single year.	ND is more likely to exceed near shore and not in the main lake. Different from the NLA analysis. Favors higher exceedance frequency. Higher nutrient retention times. Proposed exceedance frequency of 0.03. Main vs. edge of lake related to chl-a. if assessing chl-a in center and looking at microcystin at edge of lake --
	Certainty level	90%	The certainty level reflects how confident a state wants to be when making a decision. Higher certainty levels reflect greater confidence that the designated use will be protected. Additional considerations include: - Whether the chl-a values appear to be relatively "stable" across varying CLs. See table 1 in the appendix for details. Exceedances of the microcystin criterion could result in impacts to human health.	

			Therefore, R8 recommends states set a more protective (higher) CL to minimize the impacts to human health.	
Hypoxia https://nsteps.epa.gov/apps/chl-hypoxia	Elevation	Site-specific	Range of elevation for a given state and/or ecoregion	
	Critical Temperature	18 degrees for coldwater species 24 degrees for coolwater species	Values based on temperature tolerance (McMahon et al. 1984, Jacobson et al. 2008). EPA report notes that these are examples and that other critical temperatures can be applied for other species and life stages.	Note that N/A may be the result from the model for sliders set at lower end of range for temperature, and high end of range for for refugia depth and DO concentration. Other approaches would be needed
	DOC	Site-specific	Range of NLA DOC concentration for a given state and/or ecoregion, if state-collected data are not available	If DOC expected/known to be outside of NLA range in a waterbody, re-run model with state/tribe data
	Depth below thermocline	Site-specific	Range of hypolimnetic depth for a given state and/or ecoregion.	
	Refugia		WI and MN have studies of refuge that identified 1 m as the refuge depth.	Slider may not allow for refugia depth required by DU (e.g., certain coldwater fish at expected density)
	DO threshold	>5 mg/L or species dependent (8 mg/L for cold water)		Range of DO concentration allowed would not protect spawning for cold water fish (may not be at issue for this time

				of year/location)
	Certainty level	CL should reflect assessment method (i.e., 80% CL for a 10% allowable exceedance frequency)	The certainty level could be tied to the state's assessment method. Region 8 states commonly use 10-15% as an allowable exceedance frequency for DO.	
Chl to TN https://nsteps.epa.gov/apps/tp-tn-chl/	Lake depth	Site-specific	Range of lake depth for a given state and/or ecoregion	
	Ecoregion	Site-specific	Apply ecoregions of interest	
	Certainty level	>75% If the chl-a criterion is set at a level to protect the designated use and is reflects consideration of conditions that may result in higher chl-a concentrations, then EPA recommends CLs of 75% or above because chl-a values are fairly stable across CLs ranging from 75 to 90%. If the underlying	The certainty level reflects how confident a state wants to be when making a decision. Higher certainty levels reflect greater confidence that the designated use will be protected. Additional considerations include: - Level of protection provided by the chl-a criterion. - Whether the chl-a values appear to be relatively "stable" across varying CLs. See table 1 in the appendix for details. - Permitting confidence levels are often set at 90%	

		chl-a criterion is set at a level that may exceed current chl-a concentrations in an individual lake, EPA recommends applying a higher CL (90% or greater).		
Chl to TP https://nsteps.epa.gov/apps/tp-tn-chl/	Lake Depth	Site-specific	Range of lake depth for a given state and/or ecoregion	
	DOC	Site-specific	Range of NLA DOC concentration for a given state and/or ecoregion, if state-collected data are not available	
	Ecoregion	Site-specific	Apply ecoregions of interest	
	Certainty Level	See Chla- TN discussion.	See Chla- TN discussion.	

BACKGROUND

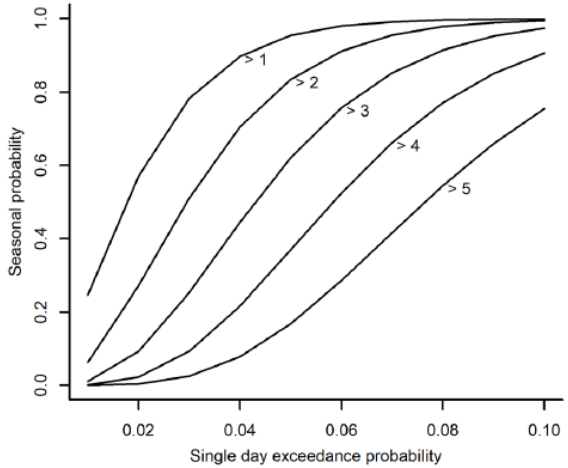

Figure 23. Probability of the indicated number of excursions observed in 10-day assessment windows during a 100-day season for different single day exceedance probabilities.

1. How do I select the certainty level?

The certainty level, or credible interval, specifies a range of possible criterion values within which the actual value lies with the specified probability. For example, the 50% certainty level implies that there is a 50% chance that the actual value is within the specified bounds (i.e., the 50% certainty level is bounded by the 25th and 75th percentiles of distribution of possible criteria). In other words, the selection of 50% certainty level indicates that 25% of possible criterion values lie on either side of the model's best prediction. Because the criterion is based on the lower bound of the 50% certainty level, there is a 25% chance that the derived criterion value is greater than the concentration needed to achieve the desired condition. That is, there is a 25% chance that the criterion is under-protective. More certainty on the criterion value is achieved by selecting greater certainty levels. For example, there is only a 5% chance that a criterion based on the 90% certainty level would be under-protective. The R Shiny apps provide transparent information regarding the effects of different levels of certainty and can provide a useful means of engaging with stakeholders regarding the risk management decisions underlying criterion development.

Zooplankton Model Outputs

Depth	Slope	Certainty Level	(µg/L as a seasonal geomean)
<3.8 m	0.0	75%	71
		90%	51
	0.1	75%	43
		90%	33
	0.2	75%	25
		90%	20
3.8 - 8.0 m	0.0	75%	26
		90%	21
	0.1	75%	15
		90%	12
	0.2	75%	6
		90%	3
>8.0 m	0.0	75%	15
		90%	13
	0.1	75%	10
		90%	8
	0.2	75%	6
		90%	5

Microcystin: Target concentration of 8 ug/L for recreational use attainment

Allowable Exceedance Frequency	Certainty Level	Chl-a Output (µg/L as a seasonal geomean)
0.05	75%	14.6
	90%	7.8
0.03	75%	12.9
	90%	6.8

Meeting Attendance			
Meeting	**Water Quality Standards Workgroup**	**Meeting Date:**	**January 10, 2022**
Chair:	**C Bittner**	**Place/Room:**	**Remote via internet**

Name	Affliliation	
Chris Bittner	DEQ/DWQ	
Ben Holcomb	DEQ/DWQ	
George Parrish	USEPA R8	
Lisa Kirschner	PBL/RTKC	
Jay Olson	Utah Dept of Food and Agriculture	
Leland Myers	WFWQC	
Teresa Gray	SLC Public Utilities	
Joe Crawford	CUWCD	
Brad Rasmussen	USFWS	
Brian Somers	Utah Mining Association	
Tina Laidlaw	EPA	
Elise Hinman	DEQ/DWQ	
Jeff Ostermiller	DEQ/DWQ	
Jake Vanderlaan	DEQ/DWQ	