2018 Integrated Report (IR) - TCEQ Guidance Advisory Workgroup Verbal Comments--August 24, 2018

Topic	Comment	TCEQ Response
2016 Assessment Summary/2018 Goals and Process	Why was there such a big decrease in the number of bacteria impairments this time?	The decrease in the number of bacteria impairments is the result of approved TMDLs for bacteria which moved impairments from Category 5 to 4a. Moving the waterbodies to Category 4a removes them from the 303(d) list.
	Where were the copper impairments?	The copper impairments were in the bays along the coast in the Galveston and Corpus Christi areas. The impairments are in the following segments: 2425 - Clear Lake, 2453D - Lavaca Bay Ship Channel Area, 2454 - Cox Bay, 2482 - Nueces Bay, 2484 - Corpus Christi Inner Harbor.
	When will the data provider review period be for the 2018 IR?	The data provider review will be held in March 2019.
Update on Reservoir Nutrient Assessment Methods	Why was the total nitrogen (TN) threshold raised from 0.58 to 0.8 mg/L and how was it recalculated? These were TN values (not a limiting nutrient) that you raised the criteria for? Given all the research coming out of the Mississippi Gulf with nitrogen loading, doesn't this seem counterintuitive?	The value was raised in response to public comment received following the 2016 Guidance Advisory Workgroup held during July 2015. The 0.8 mg/L TN threshold is based on the 95% confidence interval from a 2013 University of Arkansas report (Citation: Database Analysis to Support Nutrient Criteria Development, University of Arkansas 2013 report to TCEQ, final report submitted under contract number 582-12-21325. Principal investigators: Brian E. Haggard, J. Thad Scott, and Michelle

		Evans-White.). The revised threshold represents the concentration of TN at which statistically significant changes in magnitude and variability of Secchi depth occur in reservoirs (statewide). TCEQ is evaluating TN and total phosphorus (TP) together. Many reservoirs in Texas are naturally eutrophic and may be co-limited by both TN and TP.
	How was the upper threshold of 40 ug/L for chlorophyll *a* calculated?	The threshold was based on information published in the following paper: Yuan, Lester L., et al. 2014. "Managing microcystin: identifying national-scale thresholds for total nitrogen and chlorophyll *a*." Freshwater biology 59(9): 1970-1981.
	How is the dissolved oxygen (DO) status or impairment category determined?	Dissolved oxygen criteria (24-hour average and 24-hour minimum) is used to determine attainment of aquatic life uses in any assessment unit (AU) in the water bodies that will be included in the 2018 Integrated Report. This information, specifically dissolved oxygen concerns or impairments for the reservoirs in Appendix F of the assessment guidance, is used in the nutrient assessment.
	In the flow chart, the wording should be changed from "Secchi depth exceed threshold" to clarify that this means it does not meet criteria.	We made this clarification in the 2018 Assessment Guidance.

	How is the Secchi depth threshold determined?	It is calculated from historical sampling data, set at the upper parametric prediction interval, 90% confidence level (site-specific).
	What is the difference between the numeric criteria and the narrative criteria, and looking at the Narrative Criteria flow chart, why does the first box refer to a numeric variable if it is narrative criteria?	Narrative criteria are assessed using numeric translators of the nutrient criteria as discussed in the TSWQS Sections 307.7 and 307.4. The narrative method applies to those 36 reservoirs whose numeric criteria for chlorophyll *a* were disapproved by EPA in the 2010 TSWQS. These reservoirs are assessed using numeric translators of the narrative nutrient criteria in the Texas Surface Water Quality Standards, with a similar framework (flow chart) to those reservoirs with numeric criteria for chlorophyll *a* that were approved by EPA in the TSWQS Appendix F. The first box in the flow chart refers to a numeric variable because it is a numeric translator of the narrative nutrient criteria.
	In the Narrative Criteria flow chart when it says "Is 10 year change in Chl-a TSI>10?", does this mean the TSI increases by 10 or that the TSI is greater than 10?	The statement means that the chlorophyll *a* TSI change increases by at least 10.
	Why were the TN and TP being used instead of just the TSI?	The TSI does not include a score for TN. The TSI only includes scores and rankings for Secchi depth, chlorophyll *a*, and TP. We wanted nutrient evaluations to include both TN and TP as possible nutrient stressors.

	The example site on slide 8 of the presentation does not have a TSI?	There is not currently a chlorophyll *a* TSI for this site (Lake Corpus Christi).
	How does a missing piece of data play into the evaluation, and how would you proceed?	If any of the required parameters are missing, then nutrient enrichment could not be evaluated using the flow chart. The outcome for this method would be "not assessed."
	How much data is needed to develop a TSI ranking?	According to the guidance, a minimum of four chlorophyll *a* measurements, two TP measurements, and two Secchi depth measurements are required over the period of record for a reservoir to be included in the TSI ranking.
	Was turbidity considered? Why did you choose to use Secchi depth rather than Turbidity data?	Turbidity was considered. There are different methods for measuring turbidity and Secchi depth is the most available and consistently reported method related to turbidity/water clarity. Also, scientific literature relates Secchi depth response more closely to nutrient stressors than turbidity.
	What is TSI?	TSI stands for Trophic State Index. It is reported with the Integrated Report (IR) as part of the Trophic Classification for Texas Reservoirs report. TSI is calculated for chlorophyll *a*, Secchi depth, and TP.
	How is the TSI determined, and why don't you have a TSI for all reservoirs?	The chlorophyll *a* TSI is determined using the equation listed on page 2 of the Draft 2016 Trophic Classification for Texas Reservoirs report. A minimum of four chlorophyll *a* measurements, two TP and two Secchi depth measurements are required for a reservoir to be included in the TSI ranking as part of the Trophic

		Classification for Texas Reservoirs report. In the procedure to assess narrative nutrient criteria in reservoirs using TSI, a 10-year change in chlorophyll *a* TSI is evaluated. If there is not a ten-year trend available, then a TSI change cannot be determined. This can happen if there is a change to the stations, for example. Some reservoirs do not have a TSI because there is insufficient data to compute the TSI.
	(Follow up to above) Shouldn't you be able to use data from both stations for the 10-year trend if the stations are representative of the same conditions?	The TSI method specifies use of a station center-lake near dam, so the data from a dam station could not be combined with data from a non-dam station. Historically, most data are available from the dam station.
	Will there be explanatory text available with the slides once they are posted online?	The TCEQ acknowledges this comment. The presentations as they were provided at the meeting are posted online. No additional explanatory text is included.
	Is the Supplemental Nutrient Report going to include the reservoirs with numeric and narrative criteria?	All 75 reservoirs are included in the Supplemental Nutrient Report.
	Can you give an update on the chlorophyll *a* project?	The project is in the early stages. The project will compare different lab methods used to analyze chlorophyll *a* samples at multiple labs. For more information regarding this project, please contact the TCEQ SWQM Program.
	Is the annual mean chlorophyll *a* based on monthly sampling?	It is mostly based on quarterly sampling.

Addressing Drought and Use Attainment	Have you looked at seasonal effects and how that would result in variances?	There are no plans to evaluate seasonal effects as chlorophyll *a* is considered part of the long-term assessment.
	Are you using the line of evidence approach on reservoirs that are used for drinking water supply?	A line of evidence approach is used on reservoirs that are used for drinking water supply.
	How did you determine that using the average reservoir percent full was more appropriate than the median?	The median percent full would go over 100% full since the reservoir would, at times exceed normal pool elevation; therefore, it did not make sense to use median for this analysis.
	Looking at slide 61, when you say you used a combination of options A (reservoirs level declining to historic low) and C (DSI=5 or DSI=4), does that mean A (reservoir percent full declines towards historic low) or C (DSI=5, DSI=4), or A and C have to be met?	Choices A and C have to be met.
	How do you define "decline toward historic low"?	Reservoir levels would need to trend towards a value near the historic low. Observed reservoir levels do not have to actually reach a historic low in order to meet our criteria for drought; levels just need to be trending toward a value near the historic low. Historic reservoir levels are available from the Texas Water Development Board for each reservoir. Some of the historic lows for each reservoir were observed during our 2016 IR period of record (12/01/2007 - 11/30/2014).
	Looking forward, a DSI Score of 4 might be the new Score of 3. How do you account for these changes in how DSI scores are defined?	The TCEQ acknowledges this comment. We only use DSI scores to look back over a period of record, based on the drought categories developed by the Drought Mitigation Center. We are unable to forecast potential future changes to drought classification system by the Drought Mitigation Center. If categories are revised in the

		future by the Drought Mitigation Center, then TCEQ will consider the revisions in accordance with Section 307.9 of the TSWQS.
	To clarify, the data collected during the period determined as drought are removed because conditions are considered to be non-normal?	Extreme drought is considered by the TCEQ as an extreme hydrologic condition. The data during that time-period are being removed for being unrepresentative of typical ambient conditions, which may include less-severe droughts.
	Have you looked at the average percent full at different DSI's? For example, what is the average percent full when there is a DSI of 4?	The TCEQ acknowledges this comment and may further evaluate the suggested approach during the development process for future IRs.
	Have you looked at moving averages?	The TCEQ acknowledges this comment and may further evaluate the suggested approach during the development process for future IRs.
	(Follow up to above) If you were to change the approach and look at the moving averages, would you reinstitute the data that had previously been thrown out?	Data removed from previous IRs will not be used in subsequent IRs.
	If there are 2 drought periods during the IR period, then it is what it is. You don't necessarily need to combine them or chose one over the other.	The TCEQ agrees with this comment. In some cases, it may not be definitive whether one long or two shorter drought periods are occurring, and some best professional judgment may be necessary.
	Have you looked at percent reversal versus percent recovery? You can try to determine where drought ended by how much it is has recovered. For example, 30% recovery of reservoir level would mark the end of drought.	The TCEQ acknowledges this comment. This is not practical within the scope of the IR. A meaningful evaluation of reservoir recovery representing a return to ambient conditions would require extensive knowledge of site specific hydrology and

		physical/chemical characteristics of the surrounding landscape.
	Perhaps use a looping average by adding a third parameter such as persistence of drought.	The TCEQ acknowledges this comment and may further evaluate the suggested approach during the development process for future IRs.
	When looking at situations, such as what is seen with Choke Canyon Reservoir where there is a long period of drought, should you really be trying to mitigate impacts, since this is the normal condition for most of the IR period? You may want to revisit the chlorophyll *a* standard if this reservoir is always in drought.	The TCEQ acknowledges this comment. The drought methods have been developed to be applied on statewide basis. By limiting the number of site-specific variables (reservoir level and DSI) we can evaluate all possible candidates in an efficient manner. Information concerning specific reservoirs can be considered on a case-by-case basis.
	Have you looked at records of flow releases and considered excluding data for big releases?	The TCEQ acknowledges this comment. We have not looked at flow release records specifically. However, with our current method, we look at reservoir level, which is inclusive of big releases.
	Are you looking at flow from above the reservoir?	Flow from above the reservoir is not looked at directly. However, the DSI incorporates USGS data when creating the scores.
	If there are no releases from a reservoir, due to drought, then inflows could contribute to a rise in chlorophyll *a* concentrations.	The TCEQ acknowledges this comment. Information concerning specific reservoirs can be considered on a case-by-case basis.
	Some flow-through reservoirs, without Public Water Supply use, are maintained at a constant level yet could still be affected by drought.	The TCEQ acknowledges this comment. The existing drought procedure can still identify drought impacts on “constant level” reservoirs as was done with Lake Cypress Springs. Reservoirs without Public Water Supply Uses may not have available information concerning

		capacity, making it difficult to employ the drought procedure.
	How do you factor in events such as Tropical Storms that impact the reservoir while the rest of the period is in drought?	Site-specific information can be considered on a case-by-case basis. However it should be noted that the IR integrates data over a 7-year period as to limit the impacts of short-term events.
	If you looked at the moving averages, it would show the next onset of drought and the water level and DSI would show the drought period.	The TCEQ acknowledges this comment and may further evaluate the suggested approach during the development process for future IRs.
	It is important to get input from people who work with that water body, because as an example, if there are repairs being done to a dam they might drop the water levels, and the data will make it look like drought when in reality it is not. It seems appropriate to solicit input on drought listings since each reservoir is managed differently, and run of river reservoirs essentially represent water quality in the contributing stream/river.	The IR process includes a public comment period, where stakeholders, the public, and data providers can provide comments regarding the draft IR. Additional information received during the public comment period will be considered.
	It is very difficult to capture everything by looking at data alone, because there is so much complexity. In cases of inter-basin transfers or polishing of Trinity River water and returning to reservoirs, the situation is more complex than may be expressed by graphs. The raw data may reflect an impairment and result in erroneously removing them.	The IR process includes a public comment period, where stakeholders, the public, and data providers can provide comments regarding the draft IR. Additional information received during the public comment period will be considered.
	Data reflects use impairments, so excluding data would give different results, and if a waterbody is impaired something needs to be done. Excluding data due to drought essentially "masks" impairments? Texas Surface Water Quality Standards language drives some of the data removal processes and excluding data	The provisions included in the Texas Surface Water Quality Standards (TSWQS) §307.9 (b) require that data collected during extreme hydrologic conditions must not be used to determine standards attainment.

	during extreme hydrological conditions is consistent with TSWQS. Excluding only exceedances could make it look o.k. when it is not.	
	On slide 56, the Standards say "such as high flows", but does not mention drought.	High flows are just one example of extreme hydrologic conditions. Extreme drought would be another example of extreme hydrologic conditions.
	On slide 57, you are suggesting that you would only remove exceedances which would make everything fully supporting. This seems disingenuous, making it seem like everything is fine with the water quality.	The TCEQ acknowledges this comment. This method, which was explored as an option, is not included in the 2018 assessment guidance.
	If a water body could still be Fully Supporting after removing drought data, that would imply that most of the data collected in a drought are still meeting standards.	Drought data would not be removed if the initial result was fully supporting for a waterbody.
	What did you do if you found that drought was the source of an impairment?	The water body would be placed in Category 3 which will provide for follow-up evaluations as drought conditions subside.
	Why would you consider only removing exceedances?	This was done historically for low flow in streams, to maximize the use of the available data.
	Did you go back and look at other parameters (TN, TP, DO, and Secchi) like you did with chlorophyll *a*, shown on slide 57?	Other parameters were removed if they fell within the drought period, however they were not analyzed as closely as chlorophyll *a*. The guidance was revised to make sure this is clarified for the line of evidence method.

	Looking at slide 57, why is there so much variability in the chlorophyll *a* criteria?	The goal of developing nutrient criteria for Texas was to move away from broad statewide screening values and to develop criteria based on site-specific data. The nutrient criteria included on the slide represent values derived from historic, site-specific data. Thus, the degree of variability in the criteria reflects the variability of site-specific conditions among each reservoir.
	Do you look at the trends for parameters that are near non-attainment to see if the trends suggest it will not meet?	The Assessment Guidance discusses trend analyses in Chapter 2. This type of evaluation is done on a case-by-case basis and where there are long-term datasets.
	Instead of using ANOVAs, have you tried using Bayesian techniques to find the probability of drought occurring in the future?	The TCEQ acknowledges this comment. TCEQ does not currently plan to use Bayesian techniques in the development of the IR.
	Suggestion: Use simple trend analyses. Using a moving average would detect a trend in Sulfate.	The TCEQ acknowledges this comment and may further evaluate the suggested approach for future IRs.
	Suggestion: You could calculate the probability of exceedances occurring during drought.	The TCEQ acknowledges this comment. TCEQ does not currently plan to perform such calculations, and would need more information to consider such a proposal.
	On slide 67 we see very high Chloride values for one station. You may want to consider changing the stations since there is such a large difference in the values at this station versus the other stations in the segment.	Per § 307.9(e)(1) of the TSWQS, assessments for TDS, chloride, and sulfate are conducted at the segment (not AU) level.
	Do you ever see flows that are higher than the 7Q2 during drought? It seems like rules for removing data below the 7Q2 is enough for rivers. Also, further drought considerations	Flow in some water bodies have been higher than the 7Q2 during drought. Data below the 7Q2 are not removed for all parameters.

	probably aren't needed if data below 7Q2 has already been removed.	
	Subsistence flows and different types of releases would result in different environmental categories. Have you looked at these environmental categories while evaluating drought in rivers?	The TCEQ acknowledges this comment. At this time, TCEQ does not have a method developed for evaluating drought in rivers.
	In rivers like the Trinity and Lower Colorado, which may be effluent dominated, how do you detect drought? In the summer, nearly all Trinity water is effluent, so base flow would be almost zero.	The TCEQ acknowledges this comment. At this time, TCEQ does not have a method developed for identifying drought-impacted data in streams.
	What is time period of the data being used to determine the 7Q2?	Typically the historical record from a nearby stream gage is used to determine the 7Q2. The Procedures to Implement the Texas Surface Water Quality Standards, RG-194 (Revised) June 2010, provides TCEQ's method for determining 7Q2, including instances where a longer period of record is available.
	Referring to the graph on slide 67, if the flow is below the 7Q2, would you remove data for all the stations within that segment?	Only the data for the station that the 7Q2 is assigned to is removed.
	It seems unclear if it is even appropriate (legal) to remove data for events where the flow is above critical flow, even if it is during drought.	Provisions in the TSWQS (§307.9 (b)) related to extreme hydrological events allow for this.
	It may be worth continuing this analysis for streams without gages, but streams with gages are already being covered by the 7Q2 which seems to be enough.	Data below the 7Q2 are not removed for all parameters.
	Suggestion: For streams without gages, use adjacent hydrologic units to model or compare as surrogates or to make inferences for a station without a 7Q2.	The TCEQ acknowledges this comment. For the purpose of the IR, using models requires an extensive amount of data that is impractical to implement each IR cycle for numerous waters in the state.

	Suggestion: Develop a 7Q2 equivalent for reservoirs.	The TCEQ acknowledges this comment. In terms of extreme hydrologic conditions, a low percent full for reservoirs is analogous to a critical condition (7Q2).
	Have you considered flow-weighted concentration?	The TCEQ acknowledges this comment. The assessment will continue to be based on actual, rather than flow-weighted concentrations.
	What do the Standards say about removing data during high flow?	The TSWQS (§307.9 (b)) specify that sample results that are used to assess standards attainment must not include samples that are collected during extreme hydrologic conditions such as high- flows and flooding immediately after heavy rains.
	What is considered severe low flow?	0.1 cfs
	Are these low flow methods applied to all standards?	The low flow methods are only applied to the parameters listed in §307.9(e)(8) of the TSWQS.
Considering High Flow in Assessments	By removing data from low flow events, wouldn't your dataset become biased toward flow rather than routine monitoring?	Datasets should not include extreme low flows or extreme high flows. By using data over a 7-10-year period in the assessment, any flow-based bias should be minimized.
	To clarify, initially you are looking at all the data, then if it is determined that it is a low flow event the data are removed?	Correct.
	Referring to slide 15, for the sample events that had a flow severity of 4 (Flood), was data actually collected?	These sample events currently have data in the database.
	Would you exclude data from events where the flow severity was 4 (Flood) and from events with a flow severity of 5 (High)?	Only data where the flow severity is a 4 would be removed. Flow severity is subjective and can vary by collector, so data with a flow severity of 5 would not be excluded.

	Is there concern that there is a disincentive for collecting data if the flow is below the 7Q2?	We have no concern since the collector typically does not know what the 7Q2 is before beginning a sampling run and will collect a sample regardless.
	Are you looking at a hydrograph to determine whether the flood water is rising or falling? It could be that the flood conditions last for 1.5 years because the water is slowly being released, but it may not be appropriate to exclude this data since that was the normal condition during that 1.5 year period. This is similar to the drought that persists for a long period of time. This is the normal condition for that time period.	For the 2018 IR, provisions for removing data collected at high flows were added to the assessment guidance to allow for consideration of this type of information. The TCEQ may further evaluate the possibility of identifying flood recovery period during the development process of future IRs.
	If you have flow estimate data, would this be used along with the instantaneous flow data to determine the 90th percentile?	Only the instantaneous flow data will be used to determine the 90th percentile, and this will be done on a case by case basis.
	In addition to reporting flow severity, collectors could also state whether it was on the rising or falling limb of the hydrograph. Collectors do report days since last significant precipitation, which could be used. Data collectors can also inform basin assessors whether or not they think that data should be used. Some streams may have historical gages that could be used to determine rising/falling limb.	Information regarding the rising or falling limb of the hydrograph is not typically collected by field staff since it may not be known with a high degree of certainty. It would be difficult to perform this check on historical gages for every flood event. Days since last rainfall is a parameter that is collected and could provide information about the timing of the sampling in relation to the hydrograph. Regarding the use of days since last significant precipitation, the TCEQ may further evaluate the suggested approach during the development process for future IRs.
	Chances are low of getting an instantaneous flow measurement during flood conditions.	This is why flow severity will be considered as part of this method as it will provide the best available

		information on the flow without an actual instantaneous measurement.
	If you have a watershed without flow data, you can use adjacent watersheds to estimate whether or not the flow is below the 7Q2.	This will not be done for 7Q2 calculations.
	In the Standards for spring flow driven streams, it says to use the gage closest to the site to determine flow, but sometimes there are historical gages that may be further from the site that are more representative than newer gages that are closer to the site.	Implementation of the standards affords some flexibility when evaluating flow in spring flow dominated systems. If there is better information from a more distant gage that may be considered as part of the assessment. This would be done during the data provider processes.
	Are you looking at flow from above the reservoir?	Flow from above the reservoir is not looked at directly. However, the DSI incorporates USGS data when creating the scores.
General Discussion	It has been found that some labs have difficulty with copper and low level cyanide analysis, so what QA/QC is being done to ensure we are using representative data?	QA/QC requirements are described in quality assurance project plans, and laboratory methods. The laboratories performing analyses of water samples are accredited.