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Agency Contact for this Package

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Ohio EPA held an interested party comment period from June 20, 2018 to July 20, 2018 regarding three Implementation of Water Quality Standards (Modeling) Program rules. This document summarizes the comments and questions received during the associated comment period.

Ohio EPA reviewed and considered all comments received during the public comment period. By law, Ohio EPA has authority to consider specific issues related to protection of the environment and public health.

In an effort to help you review this document, the questions are grouped by topic and organized in a consistent format. The name of the commenter follows the comment in parentheses.

General Comments:

Comment 1: One outstanding need to meet the intent of HB 49 would be extensive outreach to the general public. If the effort is adequate, Ohio EPA can readily gather a list of interested parties. However, this effort must be very proactive on the part of Ohio EPA and not rely on casual connections by the general public who might find an announcement for a TMDL on Ohio EPA’s WWW site through happenstance. The Agency should not rely in limited postings to the agency website. Instead, multiple postings should be made, and the agency should provide notice at multiple locations on the website. These postings should be made well in advance of due dates for input (i.e., publish a tentative schedule
for input so that the general public has reasonably adequate time to react. We emphasize that 30 days generally is not an adequate amount of time for the general public to be made aware of a TMDL step and be able to respond to it. The Agency website is far too large, and the TMDL content too obscure for the general public to readily find such announcements and related information. The information also should avoid jargon and rely on plain English to convey the actions and content of the steps in the TMDL process. (The Darby Creek Association)

Response 1: Ohio Revised Code (ORC) Section 6111.562 requires a minimum comment period of 30 days for stakeholder notification. Comment periods can be extended if needed. Extensions may be granted as time and circumstances allow. As for the website, the Agency will continue to post notice in several different places (such as the DSW homepage, see response to comment 2 below) to get more citizens and groups involved.

Comment 2: The Agency might not be in regular communication with many stakeholders among the general public, as, without state funding, things like the watershed coordinators program have declined significantly in activity level in parts of Ohio. An important need for a successful implementation of this HB 49 law and rule would be “how would Ohio EPA ensure that stakeholders, especially members of the general public, are well-informed of TMDL-related plans and proposed actions?” While it is true that the general public can get on an email list and get Agency notices, it’s unlikely that the general public is aware and knows such opportunities exist. Therefore, we strongly encourage the Agency to make additional efforts to reach the general public. It is our experience that members of the general public, such as those interested in Ohio stream health, are not aware of proposals to initiate and write TMDL report or the preceding steps, such as study plans and water quality reports. With the extended period between updated TMDLs at 20 years, and perhaps more, we think that public awareness might be even less likely.

For example, a search using the Search function on Ohio EPA’s page https://ohioepa.custhelp.com/app/answers/list/st/5/page/1, and typing “TMDL” in the Search box yielded only one result, and that was on “How Geographic Information System (GIS) is used to establish Total Maximum Daily Loads (TMDLs).” So, there was nothing about how to sign up for notices. Significantly, a member of the public would need to use the https://ohioepa.custhelp.com page to get to that point, a series of clicks that seems few are likely to connect.

As Ohio EPA’s fact sheet on these rules states, “House Bill 49 specifically requires the Agency to adopt rules that establish ...

- Procedures for providing notice to stakeholders.
- Criteria for determining significant public interest in TMDL development"
Therefore, we strongly encourage Ohio EPA to ensure that there are multiple times that the general public, which are key stakeholders in the TMDL process, can become aware of the process. We suggest regular announcements of the process before it starts and as each step is initiated, efforts by Ohio EPA to reach out to the general public (including those not representing the regulated community or local public officials) and form email groups and use multiple social media posts that are regularly updated. The opportunities that TMDLs are in planning stages and allow for public input must be prominently displayed on multiple parts of the Ohio EPA WWW site.

Example locations for announcement of TMDL-related steps:

http://epa.ohio.gov/#153734554-calendar Provide dates for when inputs are due
http://epa.ohio.gov/dsw/ Provide announcements for each TMDL step under “Documents Available For Comment” and under “Announcements”
http://epa.ohio.gov/dsw/tmdl/index Provide announcements and other content for the appropriate watershed, as well as the tabs: What's New; Ohio's TMDL Process; Implementation; TMDL Project Contacts (Highlight those that are currently under development for this last area). (Darby Creek Association)

Response 2: The draft rule language states that stakeholders will have an opportunity to comment during several steps of the TMDL development process; this is in addition to the comment period on the draft TMDL. Each step of the TMDL process will be posted under the “Documents Available for Comment” section on Ohio EPA’s Division of Surface Water webpage (http://epa.ohio.gov/dsw/), on the Division of Surface Water’s TMDL Program webpage (http://epa.ohio.gov/dsw/tmdl/index) and the Division of Surface Water’s Water Quality Programs webpage (http://epa.ohio.gov/dsw/wq). Ohio EPA will make every effort to post announcements in multiple locations on our webpage and on other platforms to ensure the material is reaching the widest possible audience.

Comment 3: Agency “Contacts” should be responsible for maintaining an ongoing list of interested parties among the general public (by “general public” again we mean including those not representing the regulated community or local public officials, but citizens, NGOs or civic organizations (among others) interested in stream and water quality issues. (Darby Creek Association)

Response 3: As more formal public notifications are a requirement of the new TMDL process, Ohio EPA staff have been working to create lists of interested parties for each watershed. Listservs have also been created so anyone with an interest can register to receive TMDL notifications. To register see: (https://ohioepa.custhelp.com/app/utils/login_form/redirect/account%252FProfile?p_ptaid=fU0xxlQZeJ1fbCPNW3VgU7LBrmqM16tQJuH5B_uF2zgZJa%7E5CwAAzA4jnaAyQGUyj9Ks2LCaJTw84vz2N5bgZd7bKXiHyXEpC60b7K6qggKs27sU8gJDUa%21%21).
Comment 4:  In the special case of a TMDL on a state or federal Scenic River, the Scenic River Advisory Council for that stream should be consulted at the earliest stages of planning so that local expertise about the stream can be a part of the planning process.  (Darby Creek Association)

Response 4:  It is standard practice for Ohio EPA to reach out to external technical groups and/or other state agencies in the development of a watershed survey plan.

Comment 5:  Plain language request: We note that the content listed in notices and possibly outreach is often too extensive and technical for some potential stakeholders to quickly become aware of what actions are being taken. If they do read a "fact sheet" or related notice, these often can be too vague to convey what content and changes are important, what changes are included, or how it affects their watershed. Ohio EPA used to prepare "information sheets" that were relatively brief summaries, but it appears these have been at least largely discontinued. Reinstating the use of these types of documents could greatly increase public awareness and participation. Steps in the TMDL process need to be summarized and written in plain language so that people are more readily aware of the planning and report's significance. (The Nature Conservancy, TNC)

Response 5: Ohio EPA acknowledges the significance of using plain language in our fact sheets to help the general public become more aware of our methods. We will take these suggestions into consideration when updating our fact sheet templates relating to TMDLs.

Comment 6:  Need for assigned coordinators: Many watersheds in the state no longer have watershed coordinators. In locations without watershed coordinators, we recommend that the Agency designate coordinators/leaders/specialists for each watershed that are "outreach coordinators" for each TSD/TMDL. The function of such staff should be in the rule, in that there should be a designated effort for creating outreach, ensuring it gets accomplished, and building and maintaining a set of interested parties/stakeholders. Some possible ways to reach out through other means could include:

- Social media - Twitter, Facebook, and the most appropriate e-newsletters (e.g., "The Resource" http://epa.ohio.gov/defa/resource.aspx).
- Email alerts from RuleWatch Ohio, https://www.rulewatchohio.gov. If each TMDL will be announced in a rule, this seems like another appropriate outreach tool. Ohio EPA needs to advertise the automated option continually, but rely on an assigned outreach leader. (TNC)

Response 6:  Each TMDL will not be announced in a rule but will have a public involvement process similar to that of the rulemaking process. Different steps in the TMDL process will not be announced through RuleWatch as they are not rules, but each comment period for each step in the TMDL development process will be announced through the Agency’s Customer Support Center listserv emails which are very similar. The Agency will also consider utilizing other forms of social media, such as Twitter, to reach stakeholders.
3745-2-12:

Comment 7:  (A)(2) Electronic Notification. As noted previously, AOMWA supports modernizing TMDL notice procedures by using website notices, emails, etc. in place of traditional newspaper publication notice. In the draft rulemaking, Ohio EPA noted at OAC 3745-2-12(A)(2) that “[t]he director may provide stakeholder notification through posting of information on the Ohio EPA website and electronic notification, or first class mail if electronic means are not available.” AOMWA supports and encourages this additional or alternative modern notification, and requests that the rules be revised to require electronic or first class mail notification. Additionally, AOMWA notes that OAC 3745-49-07(A) requires newspaper publication of only draft, proposed, and final agency actions, among other actions not relevant here. Consequently, it appears that Ohio EPA may provide electronic notification in lieu of the newspaper notification for its stakeholder involvement during the TMDL process. (Association of Ohio Metropolitan Wastewater Agencies, AOMWA)

Comment 8:  (A)(2) Need to Modernize Notice Procedures. The draft TMDL rule requires that the director follow O.A.C. 3745-49-07 in making the required notices which mandates publication in a newspaper. The vast majority of industry supports modernizing of all rule making and policy notices, not just with respect to TMDLs. Notice procedures via email and website postings are much more useful and effective than using the antiquated newspaper notice. The draft rule includes a comment at O.A.C. 3745-2-12(A)(2) that "[t]he director may provide stakeholder notification through posting of information on the Ohio EPA website and electronic notification." OOGA urges Ohio EPA to include a specific requirement that requires use of emails and website postings for notification, and not just newspaper publication. Newspapers may still be useful for some members of the public, but in this day and age, a new rule that requires notice should require email and website posting, not just recommend it. This will modernize the notice procedures which our members take advantage of, and most likely the public now uses frequently to keep abreast of changes to Ohio EPA rules and policies. (Ohio Oil and Gas Association, OOGA)

Response 7 & 8: Currently, the Agency provides notice of different TMDL steps through several different methods of communication – newspaper, e-mail, and public notice through the Weekly Review. The Agency does not typically include in rule specific methods for the mode of delivery of the notice, unless it is clearly stated in statute or some other formal regulation that the Agency is to adhere to as the public notice rules are contained in a specific set of regulations themselves, OAC Chapter 3745-49. The Agency intends to continue to give notice to the public through all of these methods of communication; however, does not think it is necessary to include this in regulation as these methods may change over time and the requirements for public notice procedures are already in an Agency regulation. At this time, the Agency does not have an email address for all NPDES dischargers so first-class mailing of notifications is necessary.
Comment 9: (A)(2) The Ohio EPA’s proposed rule, under paragraph (A)(2)(a), requires the director to provide notice and opportunity for input during the development of a TMDL at each of four stages. These stages include (i) the project assessment study plan, including portions of the plan that seek to determine the causes and sources of impairments or threats; (ii) the biological and water quality study report; (iii) the loading analysis plan and modeling approach and the water quality restoration targets; and (iv) the preliminary modeling results. These plans and reports represent some of the most technical parts of TMDL development. In order to encourage more and better stakeholder involvement in the new TMDL process (and thus have more effective TMDLs), those steps in the process need to be accompanied by an explanatory summary written in plain language. Such a summary requirement, we recommend, should be added as a subparagraph to this section.

This statement gets directly to the point of the amendments in HB 49 and the spirit of the ruling in Fairfield County Board of Commissioners v. Nally. Subparagraph (b) of that subsection, then, enumerates the parties who will receive this notice and opportunity to engage. The notified parties include the potentially affected dischargers and the county soil and water conservation districts who were at the heart of the litigation that preceded this rule package. As a catchall, the rule also requires notification to “[o]ther interested stakeholders, as necessary” – presumably referring to at least some subset of watershed users, consumers, or community members, although it is unreasonably unclear. Due to the lack of specificity and unnecessary qualifiers in this sub-paragraph, the OEC sees this catchall as problematic and potentially could result in less public involvement in this (as we had hoped) more public TMDL development process.

Without two important clarifications and/or amendments, this proposed provision risks negating the Court’s and the Legislature’s directive to the Agency to provide more and better public participation.

First, the OEC contends that there is a sizable group of stakeholders in each of these watersheds that are impacted by the strength or weakness of pollutant loads going into their drinking water source or the stream they or their children recreate. Thus, these stakeholders should be deemed “necessary.” Adding the “as necessary” qualifier sets an antagonistic tone toward members of the community vis-a-vis the health of the watershed to which they depend. The public should always be part of the public notice, and not just an “as necessary” afterthought.

Under that same paragraph (iii) these “other interested stakeholders” are defined to an extent as those who are included on a watershed specific stakeholder distribution list if available.” Just as with the qualifier, “as necessary” the qualifier, “if available.” is similarly problematic. It is unclear if such lists exist, are maintained, or who in the Agency or Division are authorized to provide names to the lists. Furthermore, how will the Agency ensure that stakeholders, especially members of the general public, are well-informed of
TMDL-related processes and proposed actions? While the Agency can claim that the general public can get on an email list and get notices, it’s unlikely that the general public even knows such opportunities exist. Furthermore, the public is unaware of which watersheds have such a list for a particular watershed, and it should not be on them to make sure that such a list does exist.

With this codified reset of the TMDL development process, the Agency itself should take a deeper look into how it develops its stakeholder lists in a way to make them more robust and more inclusive. Early partnerships with regional planning organizations, watershed groups and watershed coordinators, and even large public water systems will allow the Agency and the Division the resources to adequately locate and properly notify those in the community who will be affected (beyond just the business sector). We invite the agency to work with a committee of NGOs and public sector representatives to ensure that the effort to reach the public is exhaustive, as publishing the opportunity somewhere on the Internet is not adequate. (Ohio Environmental Council, OEC)

Response 9: The rule language has been revised at (A)(2)(b)(iii) to remove “as necessary” and “if available”. As discussed at the meeting on August 16, 2018, the Agency has taken steps to work with partnering agencies and organizations to spread information on projects and will continue to market the TMDL listservs as a method for individuals to get involved and stay involved. The Agency agrees that a plain language summary of each step in the TMDL development process is necessary and is developing a fact sheet to explain the various steps in the process.

Comment 10: (A)(2) Furthermore, as we expressed in our Early Stakeholder Comments on this rule package almost 11 months ago, transparency in the stakeholder input process is paramount. In addition to allowing input, the Agency should make available the documents and notes of discussions from the stakeholder input to make sure all stakeholders have the clearest understanding of what information the Agency considered as it reached decision on a final TMDL. Newly created ORC Section 6111.562 (A)(2) provides that the director shall make available (on the agency’s website) to stakeholders documentation, including, but not limited to, data and modeling that was relied on during each stage of development of a TMDL and plans and actions necessary for TMDL implementation. The Agency’s rules should clarify that information (in any form or media) received as stakeholder input during the technical analysis stages (not just the agency’s own documents) should also be disclosed on the Agency’s website for the specific TMDL. While this information may be available via a public records request, and thus received a number of weeks or months later, the transparency needed for a full understanding of the TMDL process demands more.

Thus, we recommend an additional sub-paragraph or official comment in the rule that directs the Agency to post technical material and other comments received by stakeholders provided during the development of the TMDL under paragraph (A)(2) of the rule. (OEC)
Response 10: Comments/input provided to the Agency throughout the entire TMDL development process will be included in the Public Participation section of the draft TMDL report, typically found in Chapter 1 of the report. The Agency will summarize how the input received was incorporated into the project or explain why the input was not included. The Agency may also prepare a formal response to comments for comments received during the four stakeholder input steps leading up to the draft TMDL, like this response to comments, where the comments received are included verbatim. These will be available on the Agency’s website. A formal response to comments will be prepared for all comments received on the draft TMDL and this will be included in the final TMDL report.

Comment 11: (A)(2)(a) Public Participation at each Phase in the TMDL Development Process.
OOGA further applauds Ohio EPA for the inclusion, in O.A.C. 3745-2-12(A)(2)(a), of consideration of public comment at each phase of the development of a TMDL, in addition to the draft TMDL itself. Allowing the public to participate in, and comment on, the study assessment plan, the biological and water quality study report, the loading analysis plan, and the preliminary modeling results will be an important step in developing appropriate TMDLs for Ohio watersheds. (OOGA)

Response 11: No response required, thank you for your input.

Comment 12: (A)(2)(a)(i) The project assessment study plan, including portions of the plan that seek to determine the causes and sources of impairments or threats. We caution that although input can be valuable at the study objective level and as a possible source of additional credible information to consider, Ohio EPA technical experts are uniquely qualified to be the final arbiters and designers of the assessment study plan, rather than the general public or stakeholders. (The Nature Conservancy, TNC)

Response 12: Comment noted, thank you for your input.

Comment 13: (A)(2)(b) Provide notice as required in paragraph (A)(2)(a). Our experience has been that most people, including those in environmental organizations and local government with environmental responsibility, often are unaware that Ohio EPA has drafted plans, reports and even TMDLs, and is not aware of their content. Much of this is due to previously limited Agency outreach and we strongly support outreach to the groups listed in the draft rules. We request that the watershed specific stakeholder distribution list always include watershed coordinators, watershed conservation groups, Scenic Rivers Advisory Councils and local governments if available. (TNC)

Response 13: Ohio EPA appreciates the suggestions on groups to include in the watershed specific stakeholder distribution list. Those not already present on the list will be added.
Comment 14:  (A)(3) As the process moves from the four technical stages of TMDL development in (A)(2)(a) to the draft TMDL report in (A)(3), the Agency again focuses its process on ensuring that the regulated community and industrial users receive the notification of the public hearing. Recognizing the lawsuit that brought us to this rulemaking, this focus is understood. However, the Agency appears to be compensating for over-involvement by industry with unnecessary under-involvement by the public. In this section, the rule increases the universe of notification to discharge permit holders and industry water users in the subject watershed, and simultaneously limits other stakeholder involvement in the public notice to those who participated in the technical proceedings. This Use-it or Lose-it way of determining who in an impacted community can receive notification of the public comment period and public hearing (and thus be reasonably expected to attend said hearing) flies in the face of the spirit of Fairfield County Board of Commissioners v. Nally, and flies in the face of the public participation envisioned in the Clean Water Act itself. While we recognize that this provision comes directly from the statute, the Agency need not only limit notice in this unnecessary fashion. Parties who have an interest in a TMDL should not be dropped for lack of expression of that interest. Interested parties should be allowed to op-out of receiving TMDL notification, but not purged from the rolls for failure to act before the full draft.

To fix this proposed public participation problem, we recommend adding a sub-paragraph (d) allowing the Director to provide notice to other potential stakeholders and users in the watershed; and developing a process for potentially interested parties to opt-out or otherwise unsubscribe to the notices. (OEC)

Response 14:  As standard practice, anyone on the Agency TMDL listserv or watershed specific stakeholder list would receive a notification at every step of the TMDL development process. To solidify that practice, a new (A)(3)(c)(iv) will be added to the rule that includes the watershed specific stakeholder distribution list or listserv for required notification.

Comment 15:  (A)(3)(d) Time period for comment on official draft TMDL: We are very supportive of the 60-day time period allowed for public comment for the official draft TMDL. The Agency has made it easier for the general public to comment especially for the draft TSD and TMDLs due to their size and technical complexity. This "extra" time from 60 (or even more) days is inconsequential compared to other major challenges, such as year-long or multi-year delays created by challenges to permit requirements or use designations suggested in a TMDL. (TNC)

Response 15:  No response required, thank you for your input.

Comment 16:  (A)(3)(e) Public hearing if significant public interest: The Nature Conservancy supports the criteria proposed to determine whether there is significant public interest and an opportunity for a public hearing. We do ask though for clarification or at least examples as to what an organized citizens group is. We
would suggest that some logical groups to might include Scenic Rivers Advisory Councils and watershed conservation organizations. (TNC)

Response 16: The Agency will expand the rule language at (A)(3)(e)(iii) to include watershed groups, trade associations, or other non-profit organizations and potentially impacted entities.

Comment 17: (A)(3)(e) Under the proposed new OAC: 3745-2-12 (A)(3)(e), Ohio EPA shall provide a public hearing under certain enumerated circumstances, including if certain defined groups make the request. While the OMA appreciates the variety of groups allowed to make the request, we request that Ohio EPA specifically add “trade associations” to the list of groups eligible to be granted a hearing upon request. Under the rule as drafted, it is unclear whether the current terms would allow for the OMA or other like associations to be granted a public hearing upon submittal of a request to Ohio EPA. (Ohio Manufacturers Association)

Response 17: Please see response 16 above.

Comment 18: (A)(3)(e) Criteria for Determining “Significant Public Interest” in TMDL Development. Current law requires that Ohio EPA provide an opportunity for a public hearing on a draft TMDL if there is “significant public interest.” R.C. 6111.563(B)(3). The draft rules include language at OAC 3745-2-12(A)(3)(e) noting that Ohio EPA will hold a hearing when a request is made by one or more public officials, seven or more citizens, an organized citizens group, or the director determines that such a hearing is in the public interest. We believe that a request for a public hearing by AOMWA, a non-profit trade association representing the interests of Ohio’s public wastewater utilities, or any of its members, both of which are composed of public officials, would demonstrate “significant public interest” and therefore require a public hearing. Please confirm that this understanding is correct. If this is not the case, AOMWA requests that the language in draft OAC 3745-2-12(A)(3)(e)(i) be amended to read “Requests are made from one or more public officials, any utility or organized utility group, any affected state, U.S. EPA or other federal agency.” (AOMWA)

Response 18: Please see response 16 above.

Comment 19: (A)(3)(e) Criteria for "Significant Public Interest" in the Development of a TMDL. Under the new state statute governing TMDLs, Ohio EPA is required to provide a public hearing on an official draft TMDL if there is "significant public interest" as determined by the Director. O.R.C. Section 6111.563(B)(3). OOGA agrees with Ohio EPA that a rule as to what constitutes "significant public interest" is appropriate as opposed to leaving such determination to policy or past practice. The Association agrees with Ohio EPA in the draft TMDL rule that a comment from a valid organization should be viewed as carrying more weight than a comment by a single individual that raises a trivial concern or is inconsistent with law. Thus, OOGA supports the draft rule language at O.A.C. 3745-2-
12(A)(3)(e) whereby Ohio EPA will hold a public hearing when requests are made by one or more public officials, seven or more citizens, or an organized citizens group. (OOGA)

Response 19: Please see response 16 above.

Comment 20: (A)(3)(e) First, Ohio Adm. Code 3745-2-12(A)(3)(e) provides an opportunity for a public hearing for the following: (1) public officials, any affected state, USEPA or other federal agency; (2) requests made from seven or more citizens; (3) requests made from an organized citizen group; and (4) the director if it is determined that a public hearing is necessary. OUG thinks it is arbitrary to limit the ability to request a hearing to these four types of stakeholders and exclude industrial stakeholders that may be impacted by the TMDL in future permits. OUG recommends including the following:

"(iv) Industrial stakeholders that may be impacted by the development of the TMDL as it is reflected in future permit limits."

Second, "requests made from seven or more citizens" is vague – it is not unusual for citizens to submit comments that are not substantive and generated in mass. OUG recommends that Ohio EPA revise the language as follows: "requests made from seven or more citizens that have previously submitted substantive comments on the TMDL at issue." (Ohio Utility Group, OUG)

Response 20: Please see response 16 above.

Comment 21: (A)(4) In Proposed 3745-2-12(A)(4), we suggest adding the following wording as underlined for better consistency with the corresponding statutory language in Ohio Revised Code (ORC) 6111.563(E)(l):

"(4) Final TMDL. After completion of the items in paragraph (A)(3) of this rule, if the director determines it is appropriate to complete the TMDL, the director shall establish a final TMDL and submit the final TMDL to U.S. EPA for approval. A final TMDL may be challenged in accordance with section 6111.564 of the Revised Code." (American Petroleum Institute Ohio, API Ohio)

Response 21: The rule language has been revised as requested to be consistent with the statute.

Comment 22: (A)(4) Establishment of a Final TMDL. In O.A.C. 3745-2-12(A)(4) which addresses the establishment of a final TMDL, the wording shown in bold below should be added to the draft language for better consistency with the corresponding statutory language in R.C. 6111.563(E)(l):

"(4) Final TMDL. After completion of the items in paragraph (A)(3) of this rule, if the director determines it is appropriate to complete the TMDL, the director shall establish a final TMDL and submit the final TMDL to US EPA for approval. A final TMDL may be challenged in accordance with section 6111.564 of the Revised Code." (OOGA)

Response 22: Please see response 21 above.
Comment 23:  

(A)(4) Second, Ohio Adm. Code 3745-2-12(A)(4) states: "Final TMDL. After completion of the items in paragraph (A)(3) of this rule, the director shall establish a final TMDL and submit the final TMDL to U.S. EPA for approval. A final TMDL may be challenged in accordance with section 6111.564 of the Revised Code."

When the legislature revised R.C. §6111 to allow the appeal of a TMDL only after the TMDL was used to justify a permit limit in an NDPS permit, it is OUG's understanding that the legislature intended that only permit holders or significant industrial users (that would have limits placed on them because of the TMDL) could challenge the TMDL because they were "injured" by the TMDL. However, my review of the statute in conjunction with the draft rules indicates that it is ambiguous regarding who may appeal a TMDL once a limit based on the TMDL is placed in a permit. R.C. 6111.564 states:

"A final TMDL established by the director of environmental protection or a United States environmental protection agency approved TMDL may be challenged during the appeal of an NPDES permit containing TMDL-based effluent limits, pretreatment limits derived therefrom, or other terms and conditions based on that TMDL before the environmental review appeals commission in accordance with Chapter 3745. of the Revised Code."

OUG seeks clarification from Ohio EPA regarding who has a right to challenge a TMDL once it is used to justify a permit limit in an NPDES permit. (OUG)

Response 23:  

The statute does not affect the general ability under Ohio Revised Code 3745.04 or 3745.07 for someone who was aggrieved or adversely affected by an NPDES permit that has a TMDL based limit from mounting an appeal. The TMDL statute pertains to the timing of when such a challenge of the underlying TMDL would occur, to which the answer is: not at the TMDL finalization itself but when the TMDL is implemented in a concrete manner, like a permit. The statute itself does not limit who may “challenge” the final TMDL during the appeal of an NPDES permit before the Environmental Review Appeals Commission (ERAC).

Comment 24:  

(C)(2) In Proposed 3745-2-12(C)(2), the reference to paragraph "(C)(1)" should be revised to "(C)(1)(c)" for consistency with the current corresponding wording in 3745-2-12(F)(2) and for improved clarity with what appears to be the intended meaning of (C)(2). (API Ohio)

Comment 25:  

(C)(2) Monitoring Requirements for Nonpoint Source Load Allocations. In Proposed O.A.C. Section 3745-2-12(C)(2), the reference to paragraph "(C)(1)" should be revised to "(C)(1)(c)" for consistency with the current corresponding wording in O.A.C. Section 3745-2-12(F)(2) and for improved clarity with what appears to be the intended meaning of (C)(2). (OOGA)

Responses 24 & 25:  

The reference has been revised to (C)(1)(c).
Comment 26: The Ohio Coal Association (OCA) submits the following comments to the Ohio EPA (OEPA) in response to the OEPA’s Interested Party Review (IPR) notification dated June 20, 2018 regarding draft rules for Total Maximum Daily Loads (TMDLs) located in OAC Chapter 3745-2. Although the OCA did not have an opportunity to submit comments during the Early Stakeholder Outreach, this IPR expressly states that the OEPA is seeking comments from interested stakeholders and that general comments and specific factual information are welcome.

Peter Black in his paper entitled *Watershed Functions* (JAWRA, Feb 1997) provides a fundamental framework for understanding the key functions of a watershed. Given that TMDLs are rationally based upon watersheds, understanding these key functions is paramount. Black states: “Restoration of hydrologic integrity without considering the context of the processes is difficult, if not impossible. It is this consideration that has led to the necessity of identifying and organizing watershed functions.” He identifies five key functions and two integrative responses to these five functions. The key functions are (1) collection, (2) storage, (3) discharge, (4) chemical reactions, and (5) habitat for the flora and fauna. The two integrative responses are attenuation (i.e., moderates peak flows and increases low flows in the annual hydrographs) and flushing (i.e., regulates the movement of mobilized chemicals). Black states that since most of the earth’s fresh water is in storage, consideration of the hydrologic cycle as movement between water storage sites enhances the functional and response characteristic of the watershed which, in turn, suggests guidance and direction for the restoration of watershed functions (i.e., more storage).

However, the primary OEPA assessment that occurs in watersheds, which strongly focuses on habitat assessment (i.e., QHEI and HHEI), confounds and confuses participants and readers of TMDLs because habitat is a result of feedback from positive or negative watershed functions, that is, they are not at the foundational level (i.e., they do not consider watershed functions nor fluvial geomorphology). Black states that habitat presumptions may be correct (i.e., lucky), but they are not guaranteed. He goes on to say that it may be erroneous or misleading to evaluate functional restoration as measured by success of habitat restoration. In other words, watershed assessments must be broader, more holistic and in the context of the watershed.

A major problem with the above mentioned habitat assessments is that they are based upon the *River Continuum Concept* (RCC), which implies the streams must be single-thread channels from its headwaters to its mouth. This could not be more wrong. Historically, streams and rivers have been impounded by beaver dams, log jams, landslides and similar structures, that is, a discontinuum. The RCC is directly causing the loss of watershed storage (i.e., draining our watersheds), which is necessary to provide the attenuation that is necessary to support chemical reactions, moderate flooding and support flora and fauna. For
smaller watersheds, the impact of the RCC results in higher peak flows that lead to channel erosion and increased flooding, and for larger watersheds, the impact of the RCC results in the annual hydrograph or flow-duration curve having more large flows and fewer low flows (i.e., decreases base flow that leads to intermittent flow), which is not desirable (e.g., 180 degrees opposite of what is needed). TDMLs must identify the correct problem so that a correct solution is developed; otherwise, we are just guessing.

Naiman, et al., states in his paper *Alteration of North American Streams by Beaver* (BioScience, Vol. 38, No. 11, Dec. 1988, p. 753) that before the arrival of Europeans in North America (i.e., pre-settlement) the beaver population was estimated to be upwards of 400 million individuals, and that beaver were found in nearly all aquatic habitats from the arctic tundra to the deserts of northern Mexico. He goes on to say that the demise of the beaver in New England area occurred from 1620 to 1640 and expeditions westward (1800 – 1850), solely for the purpose of discovering new beaver trapping areas, led further to the beavers demise with near extinction in North America by 1900. Therefore, many attributes of stream ecosystems were changed with the removal of the beaver long before modern limnological research began, and much of our understanding of stream ecosystems is derived from sites that lack the influence of this previously abundant and ecologically important herbivore. A rather kind term has been ‘coined’ by Greg Hood of the Skagit River System Cooperative located in the State of Washington to describe the lack of recognition of historic beaver influence in our watersheds by biologists and regulatory agencies as *ecological amnesia*.

Naiman states that beaver colonies of four to eight beavers constructed 3 to 7 beaver dams per mile in 1st through 4th order streams. Leopold, Wolman and Miller in their book *Fluvial Processes in Geomorphology*, 1964, identifies the following average or typical relationships between stream order and drainage area:

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Given the need for more water storage in our watersheds as described above by Peter Black, these beavers (i.e., ecosystem engineers) ‘appear’ to be ahead of their time with their dam building. We in Ohio need to radically rethink how streams are reconstructed, that is, ephemeral, intermittent and perennial
streams should be regularly impounded by beaver dams or beaver dam analogs (BDAs) or log jams rather than constructed as single-thread channels from headwaters to mouth. This is required in order to recreate the hydrologic integrity that historically existed in our watersheds. This can be most easily done in southeastern Ohio, which is a much more rural area, as compared to northeast Ohio, which is mostly urbanized, but nonetheless these concepts can be implemented across Ohio. The critically important benefit of BDAs for small streams is that peak flows can be reduced, which will reduce downstream channel erosion and flooding, and for larger streams the flow-duration curve will have large flows reduced and low flows increased (e.g., base flow increased to create more perennial flow). The initial construction of BDAs will generally recreate the habitat patches, food supply and moderate flows (i.e., reduce stream power) that is necessary, in most cases, for beavers to naturally return to a watershed, which is the most desirable outcome.

Second, after increased watershed storage, the fluvial geomorphology must be assessed. We must know whether streams are in a stable or unstable geomorphic state. The bankfull channel stage needs to be at the elevation of the active floodplain for a stable geomorphic stream system (i.e., no incision). Given that most of Ohio’s streams are unstable with some degree of incision, this is paramount to understand. The most powerful water quality improvement process in our watersheds is to have frequent flooding of streams onto their floodplains. If we have meandering streams connected to floodplains so that flooding occurs at least annually or more frequently, then we have the foundation for a healthy, geomorphically stable stream system. Once this is established, a robust riparian system with preserved floodplain width is needed (e.g., a target of no less than 5 times the bankfull width of the channel measured at a riffle section is typically suggested (Ohio’s Rainwater and Land Development Manual, Appendix 7 (2006), which is available at the OEPA website)). Again, the two primary keys to a healthy, geomorphically stable stream system is:

1. The bankfull stage connected at the floodplain elevation, and
2. The floodplain width being as wide as possibly available or at a target of no less than 5 times the bankfull width of the channel.

Frequently flooded or active floodplains increase storage (i.e., they act as linear detention basins) and moderate downstream flooding (attenuate), provide for the deposition of suspended sediments (silts & clays) which chemical pollutants are attached (e.g., nitrogen and phosphorus), recharge groundwater, improve denitrification by increasing hyporheic flows which increases subsurface biological activity, and many others. Costanza, et al., in his paper The Value of the World’s Ecosystem Services and Natural Capital (Nature, Vol. 387, May 1997, pp 253-260) identifies floodplains as providing more ecosystem services than any other landscape unit. The ODNR Floodplain Management Programs publication The Antediluvian (Volume XX, Issue 1, pp. 15 to 17) discusses that the estimated value of floodplain services is upwards of $12,492 per acre per year in 2013 dollars. For comparison, a well-developed forest, which ranked
second behind floodplains, provides estimated services upwards of $618 per acre per year in 2013 dollars. This comparison of services quickly demonstrate the magnitude of floodplain value (i.e., about 20 times more valuable). Therefore, TMDLs need to strongly focus on understanding the fluvial geomorphology of our streams and restoring and/or preserving floodplains.

Again, these processes are foundational relative to habitat assuming that streams are geomorphically unstable (e.g., the bankfull stage of stream is not connected to its floodplain).

A major misunderstanding when it comes to restoring and/or preserving floodplains is the FEMA Floodplain Regulations. FEMA floodplain regulations are enforced at the local level in Ohio, which leads to approximately 800 local floodplain administrators. Communities are required to only meet the minimum requirements for floodplain regulations in order for their citizens to have the opportunity to purchase flood insurance; thus, nearly all communities in Ohio only regulate to the minimum requirements. One would intuitively think that floodplain regulations would discourage development on floodplains; however, the counter-intuitive by-product of communities only enacting the minimum requirements results in the encouragement of floodplain development.

FEMA strongly encourages local communities to preserve and protect the natural and beneficial functions of their floodplains, but communities must enact higher standards for this type of regulation to occur. For example, the minimum floodplain regulations provide for an allowable one-foot rise in the base flood (i.e., 100-year or 1% annual chance flood). The consequence of this large of rise for smaller watersheds (e.g., 50 square miles or less) is that the entire floodplain can be filled to the stream banks before this one-foot rise occurs. An entirely filled floodplain is obviously a disaster for a healthy, geomorphically stable stream system. Thus, a higher standard floodplain regulation might be to reduce this one-foot allowable rise to say 0.2-foot (i.e., scale the allowable rise down as drainage area decreases). This would greatly restrict the amount of fill that could be placed on the floodplain. Unfortunately, this limitation would only apply to streams and floodplains that are mapped to floodplain regulation standards (i.e., base flood water surface profile modeling has been developed and adopted in the local community’s regulations).

Most all citizens of Ohio are not likely to understand that they pay for degraded water quality through their waste water bill and/or drinking water bill, if they have a surface water source. However, moderation of rate increases for these costs can be achieved by preserving and restoring the assimilative capacity of our stream and floodplain systems to use natural processes to improve our water quality. Even though the potential to regulate floodplains to higher standards appears low, the potential to purchase active floodplains to preserve them are great. Local water and waste water plant operators can rationally use rate-payers’ dollars to purchase these lands rather than using the same dollars to build new water and wastewater treatment plants or expansions of current plants. Further, new plants or expansions do not do anything to preserve or restore streams, floodplains, wetlands or habitat.
In conclusion, there are many functions in our watersheds that need to be identified well ahead of habitat alone that are foundational towards the restoration of the hydrologic and physical integrity of our watersheds. These functions must be understood, identified and enacted upon so that citizens of Ohio reap the benefits of sound, effective TMDLs that yield not only the restoration of habitat, but also the restoration of watershed, wetland, and stream & floodplain functions. Southeastern Ohio is on forefront of these opportunities due to the rural nature of our watersheds. However, current regulations are not working towards these desirable outcomes partly due to lack of knowledge related of these functions and partly due to lack of desire to improve these regulations. As Peter Black states in his Watershed Functions paper, watershed analysis takes a team approach, which likely includes a hydrologist, a fluvial geomorphologist, a hydraulic engineer with understanding of sediment transport, a soil scientist, a biologist, a plant materials specialist and other specialists as needed. No one group will ever solve these problems. Currently, watersheds are taken out of context and narrowly viewed from a habitat or biological perspective. This narrowness is to the detriment of Ohio’s streams and ultimately its citizens. Due to this narrowness, streams may need to become highly degraded before habitat and biological assessments identify that adverse change is occurring to a stream. Meanwhile tax payers are left spending additional money for degraded water quality due to lost stream functions and for the repair of damaged infrastructure (e.g., bridges, sewer lines) due to stream erosion (e.g., incision, widening, meander pattern adjustment). This is not necessary if proper watershed and fluvial geomorphic assessment tools are employed. We strongly urge the OEPA to expand their understanding of watershed and fluvial geomorphic functions & processes so that more holistic decisions are made towards water quality improvement. Lastly, the OCA has previously provided comments on the proposed Water Quality Certified Professional (WQCP) program and the Credible Data Program (Wave 2) via Early Stakeholder Outreach comments. We incorporate these same comments into these TMDL comments, because they discuss in more detail some of the comments provided above. We have attached these comments for your convenience.

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The OCA is strongly committed to improving and restoring our watersheds, wetlands, and streams & floodplain systems as well as providing social and economic benefits to our employees, suppliers, neighbors and friends. An example of these efforts has long been demonstrated by Ohio coal companies in their efforts to remine and restore abandoned mined lands, both surface and underground mines, which eliminates dangerous highwalls, sedimentation, acid mine drainage (AMD) and similar issues across southeastern Ohio at no cost to the public. Further, we continue to demonstrate this effort by submitting these comments and requesting to be directly involved in the development and/or updating of TMDLs that overlap the traditional coal mining region of Ohio (i.e., southeastern Ohio). We sincerely thank the OEPA for the opportunity to submit these comments via IPR.

Stream Functions Pyramid

Figure 1 – Stream Functions Pyramid Overview, Harman, et al., Stream Mechanics, 2014.

(Ohio Coal Association)

Response 26: Thank you for your comments regarding watershed restoration. As part of a Total Maximum Daily Load Report, Ohio EPA develops an implementation plan to recommend the types of practices or best management plans (BMPs) that can be implemented by interested stakeholders in a watershed to restore water quality. Ohio EPA’s implementation recommendations include similar concepts to those discussed in the comment. Please see the Big Darby Creek TMDL
report for an example (http://epa.ohio.gov/dsw/tmdl/SciotoRiver#122446488-tmdl-report).

Ohio EPA’s Nonpoint Source program provides grant funding to restore water quality impairments attributed to nonpoint sources. Practices available for funding are included in Ohio’s Nonpoint Source Management Plan Update (http://epa.ohio.gov/Portals/35/nps/NPS_Mgmt_Plan.pdf). Please see the following projects for examples of practices that have been installed that implement some recommendations contained in the comments:

- Bath Creek Stream Restoration (http://epa.ohio.gov/Portals/35/tmdl/Implementation/CuyahogaLowe r_BathCreekRestoration.pdf)
- Miller Valley Wetland Restoration at the Wilds (http://epa.ohio.gov/Portals/35/tmdl/Implementation/Wills_MillerVally Wetlands.pdf)
- Multiple projects in Big Darby Creek watershed (http://epa.ohio.gov/dsw/tmdl/SciotoRiver#122446490-implementation)

Finally, the TMDL program maintains listservs for stakeholders interested in the various steps of the TMDL development process. To stay involved, please register at: https://ohioepa.custhelp.com/app/utilis/login_form/redirect/account%252Fprofile?p_ptaid=fU8siWteLt4cSFsa4Q7GYelw0NdYDLTdwZkrmiWmEysuuUsCscs1Xpxp VSL_6hQthSYoshJpMC_YQzyFh5fAF1sXT5LNpOFJCI2MxglUMR_pBuPHHn2dy7EhkQhw%21%21.

- End of Response to Comments -
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Ohio Coal Association IPR Comments - TMDL and Modeling Rules (OAC Chapter 3745-2)
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*Figure 1 – Stream Functions Pyramid Overview, Harman, et al., Stream Mechanics, 2014.*
The Ohio Coal Association (OCA) submits the following comments of concern regarding the draft rules for the Ohio EPA (OEPA) Water Quality Certified Professional (WQCP) program. We have substantial concern that a WQCP program will memorialize requirements that are adverse to the Clean Water Act, and businesses and the citizens of Ohio.

The Clean Water Act objective is to restore and maintain chemical, biological and physical integrity of the Nation’s waters. The OEPA has been a leader in sampling and analyzing the chemical and biological integrity of Ohio’s streams and rivers. However, it has not performed at a similar standard at understanding the physical integrity of these waters and, at times, misrepresents the actual field conditions due to this lack of physical integrity understanding.

The OEPA uses the Qualitative Habitat Evaluation Index (QHEI) and the Headwater Habitat Evaluation Index (HHEI) to evaluate the physical integrity of Ohio’s streams. These assessment methods are not sufficient to determine the physical integrity of streams. These tools (i.e., QHEI or HHEI) tell you nothing about whether the stream is stable or unstable, the degree of instability or the degree of recovery. Although these tools describe various stream attributes at the time of the QHEI or HHEI field assessment, these assessed attributes are not sufficient to understand whether or not a stream is stable. For example, the QHEI gives higher scores (i.e., better) for larger stream substrate (e.g., cobbles, boulders). Larger stream substrate may be the result of channel instability, such as, a headcut (i.e., the headward advancement of channel instability) working its way upstream and eroding away smaller substrate that was properly sized for the former stable channel. Given that a vast number of streams in Ohio are unstable, the biological assessments that are tied to the QHEI biases these channels to larger sized substrate. This can and does lead to stream restoration designs specifying too large of channel substrate in order to achieve higher QHEI or HHEI scores rather than having the substrate properly sized using sediment transport relationships (i.e., creates confusion and misleads).

Stream channels that become unstable, such as, incised streams, lose connection to their floodplain (i.e., a lowering of the channel bed relative to its floodplain elevation). Channel connection to its floodplain at the proper stage is the most important physical process necessary to maintain stable streams. Yet, the QHEI or HHEI does not mention this. Another important process for stream stability is stormwater management. If land use changes are not managed by permanent ponds and diversions to insure that watershed runoff does not increase significantly, then downstream channels can be ‘blown-out’ (i.e., degraded). The QHEI or HHEI does not address land use change or stormwater management to understand past, current or future stream stability. These critical processes (i.e., functions) and many others are completely ignored by the QHEI and HHEI and therefore results in uncertain and likely incorrect stream assessments.

A proper physical stream stability assessment requires measurement of the channel cross-section, pattern, profile and substrate in the context of its watershed to understand a streams stability, instability or degree of instability. In short, the QHEI or HHEI poorly correlates with the stream physical integrity (i.e., stream health). This can be demonstrated by reviewing the USEPA’s published Stream Functions Pyramid. This pyramid describes that understanding a stream’s biology first requires an understanding of the stream’s watershed hydrology, hydraulics, and geomorphology, which the QHEI or HHEI fails to do. Another document published by the ODNR in 2011, A Functional Assessment of Stream Restoration in Ohio, concludes that the HHEI should not be used as an overall indicator for physical integrity. The concepts demonstrated in this ODNR document can similarly be extended to the QHEI.
Given that the OEPA has weakly correlated biological assessments with stream physical integrity, the OCA respectfully requests that the WQCP program not be advanced until such time that stream biology can be correctly correlated to stream physical integrity. It serves no purpose for Ohio businesses or citizens to have an incomplete stream assessment system memorialized into an OEPA water quality certification program to further compound the current misunderstandings between biology and the physical integrity of Ohio’s streams.

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The Ohio Coal Association (OCA) submits the following comments of concern to the Ohio EPA (OEPA) in reply to their Early Stakeholder Outreach regarding their Credible Data Program Rules – Wave 2 (OAC Chapter 3745-4). The OEPA states that it plans to reconcile the Credible Data Program with the new Water Quality Certified Professional (WQCP) Program. The OCA has previously provided comments of concern regarding the WQCP Program, which involve the OEPA’s lack of a physical integrity stream assessment that is necessary to properly evaluate streams. We further discuss this concern and a second concern regarding the incorrect application of the River Continuum Concept in the development of habitat assessments.

The Clean Water Act’s objective is to restore and maintain the chemical, biological and physical integrity of the Nation’s waters. The OEPA has been a leader in sampling and analyzing the chemical and biological integrity of Ohio’s streams and rivers. However, it is greatly lacking a proper understanding of the physical integrity of its streams and rivers, which is necessary to properly assess streams as well as achieve the objective of the Clean Water Act.

The OEPA developed two ‘tools’ referred to as Physical Habitat Assessments that measure various attributes of a stream, which are then used to correlate with biology (i.e., fish and bugs). Specifically, these tools are referred to as the Qualitative Habitat Evaluation Index (QHEI) and Headwater Habitat Evaluation Index (HHEI). In general, the QHEI is used to evaluate the habitat of streams greater than one (1) square mile in drainage area, and the HHEI is used to evaluate the habitat of streams less than one (1) square mile in drainage area. These tools do not measure and evaluate the physical integrity of streams, and they have been used as such, which is a major fallacy. These two tools characterize or score various habitat attributes to develop a rating or assessment. These habitat assessments merely place the word physical in front of habitat assessment to create a perception that a physical integrity assessment has occurred, but it has not.

A physical integrity evaluation of streams requires a fluvial geomorphologic (i.e., stream morphology) assessment and evaluation be performed, and this is clearly not provided by a physical habitat assessment (e.g., QHEI or HHEI). First, the QHEI and HHEI do not collect sufficient data about the stream to perform a stream morphology assessment. Secondly, the limited data collected by the QHEI and HHEI along with its weighting or scoring metrics indicates that certain habitat attributes are necessary for a healthy stream, which are not correct, and this leads to misunderstandings and confusion about proper stream functions.

For example, the HHEI evaluates only three stream attributes to develop an assessment score. These three attributes are substrate, bankfull width and maximum pool depth. These attributes are then given scores to develop HHEI metric points, which are then totaled. In comparison, a greater total metric score indicates a ‘higher quality’ stream. However, when you look at the individual attributes or metrics, the scoring is quickly suspect if one does not know whether a stream is geomorphically stable or unstable. First, the substrate score is greater for boulders (16 points) than cobbles (12 points), and cobbles score greater than gravel (9 points). If a stream is geomorphically unstable, then the gravels and cobbles may have been eroded or washed away downstream and only the larger boulders remain. This boulder substrate condition scores high (16 points), but in reality a geomorphically stable stream would only be gravel substrate (9 points). Therefore, understanding whether a stream is geomorphically stable or unstable is imperative to know whether a substrate size is proper in order to establish a metric score or weight it rationally. Thus, in this case, the gravel substrate should have the highest score and not the boulder or cobble. Given that most of Ohio’s streams are unstable, this is a serious flaw. Second,
bankfull channel width ($W_{bank}$) is proportional ($\propto$) to drainage area (DA) as shown by hydraulic geometry (e.g., $DA \propto W_{bank}^{0.5}$, in general terms). That is, as the drainage area increases so does the bankfull channel width at a proportional rate. Therefore specifying the bankfull width, in general, is merely restating the drainage area. A bankfull channel width measurement must be made at a riffle or step section for a consistent measure, and then compared to measurements of known stable channel reference conditions to obtain a sense or assessment weighting (higher of lower score) as to whether the bankfull channel width is associated with a stable or unstable channel condition. The HHEI does not specify a location where the bankfull width is to be measured. The Ohio USGS published the Bankfull Characteristics of Ohio Streams and Their Relation to Peak Streamflows in 2005, which provides reference estimates of bankfull channel dimensions (i.e., bankfull width, mean bankfull depth and bankfull cross-sectional area) measured on stable streams at riffle sections for various drainage areas across Ohio. Obtaining bankfull channel width measurements at arbitrary locations along a stream reach rather than at riffle sections, and not having these measurements connected to some reference condition is merely information and has no rating value whatsoever except to provide an estimate of drainage area. Thirdly, maximum pool depth is related to the channel width-to-depth (W/D) ratio measured at the bankfull stage. In general, the lower W/D ratio, the deeper the pools. However, unstable streams (e.g., gullies) have low W/D ratios and can have deep pools. Yet the HHEI does not evaluate the W/D ratio nor stream stability; thus, a maximum pool depth measurement is made without knowing the context of the stream (i.e., is it geomorphically stable or unstable and what is the W/D ratio). Similar issues exist with the QHEI, but are not discussed at this time.

Rosgen (1994, 1996, and 2001) defines geometric stream stability as the ability of a stream, over time, in the present climate, to transport the sediment and flows produced by the watershed in such a manner that the stream maintains its dimension, pattern and profile without either aggrading nor degrading. Streams continually adjusts to their sediment and flows and migrate, over time, in a down-valley direction. If this stream maintains its dimension, pattern and profile without aggrading nor degrading, then it is referred to as dynamically stable. This balance between sediment and flows was described mathematically by Lane in 1955 and is represented by the use of a balance or scale, which is referred to as Lane’s balance (refer to Figure 1). Lane’s balance states that the product of stream slope and discharge (i.e., stream power), which is the driving force, must be proportional to the product of sediment load and size (i.e., the bed and bank resistance), which is the resisting force. If these forces are not in balance, then a stream will be unstable and this instability will lead to channel degradation (i.e., incision) or aggradation (i.e., sediment accumulation).

In order to determine the morphologic state of a stream, a basic physical integrity stream assessment as proposed by Rosgen and others can be performed to classify the stream as morphologically stable or unstable or specify what degree of instability exists. In order to begin this assessment you must first identify the bankfull stage of the stream channel. Rosgen states in the first hour of his first day of his first class (i.e., Level 1) that “If you don’t know bankfull, then you don’t know sh*#!” This statement is made quickly and pointedly by Rosgen so it is clear what first and foremost must be determined to perform a stream morphology assessment (i.e., physical integrity assessment). Neither the QHEI nor the HHEI mentions this most important feature. The basic stream morphology assessment data collected to determine the physical integrity of a stream as presented by Rosgen is provide in Figure 2. Further, neither the QHEI nor the HHEI evaluate key geomorphic parameters, such as, the W/D ratio, degree of incision or entrenchment ratio that are necessary to determine stream stability or instability. This geomorphic stream assessment and resulting stream classification along with the degree of incision
provides the basic evaluation as to whether a stream is stable, unstable or what degree the instability may exist. When comparing stream morphological data (i.e., a physical integrity assessment) to the QHEI or HHEI data (i.e., a physical habitat assessment), it is quickly discernable that a physical habitat assessment is not a physical integrity assessment.

Erroneous physical integrity assessments are common place when using habitat assessment tools alone, which is what the OEPA does and recommends. Based on communications with former OEPA staff, it is estimated that the failure rate of the HHEI to properly assess a stream is upwards of 70%. It is stated to be a ‘blunt’ tool. Yet, this blunt tool or habitat assessment is used to make major decisions for Ohio’s streams, such as, preventing actions or repairs that would improve stream functions and services and is irrationally imposing major financial consequences to Ohio’s businesses and citizens, and streams are remaining impaired. Any rapid assessment tool has to have a low failure rate (e.g., 5 to 20%) to even be considered useful or have value. A failure rate of more than 50% is essentially useless and has little to no assessment value. Secondly, a rapid assessment tool has to be compared against a sound fluvial geomorphic assessment to determine its failure rate.

Case studies can be presented to further demonstrate the major disconnect between habitat and geomorphic assessments (i.e., physical integrity assessments).

A second major fallacy with the QHEI and HHEI is that they are founded in the premise of the River (or Stream) Continuum Concept (RCC), which is a ‘simplified’ depiction of a continuous single-thread channel from a streams headwaters to its mouth. For example, the HHEI manual (2012) on page 1 states, “These small streams are a natural extension of the stream continuum concept which identifies how larger streams in a watershed are dependent on chemical and biological process that occur in the smaller streams that flow into them.” Based upon this RCC (a.k.a., a teaching tool), the OEPA demands single-thread channels from the headwaters to the mouths of streams. This tool may be a good tool to help one generally understand changes in biology along the length of a stream, but it does not describe the true complexity that exists within our watersheds and streams nor does it incorporate natural historic conditions that existed in our Nation’s watersheds.

As described by Peter Black in his paper Watershed Functions (JAWRA, 1997), a key function of watersheds is storage of water. Storage is necessary because it provides the time necessary for chemical functions and attenuation (e.g., flood moderation) to occur. He further states that since most of the Earth’s water is in storage, consideration for the hydrologic cycle as movement between water storage sites enhances this functional and response characterization of the watershed which, in turn, suggests guidance and direction for the restoration of watershed functions (i.e., more storage). The consequences of the RCC (i.e., no in-stream impoundments) is that our watersheds are being drained at a scale similar to what farmers and the Soil Conservation Service (SCS) had previously ditched wetlands and streams across a much of Ohio and the Midwest. The only difference is the terrain.

River Discontinuum Concept (RDC) is a competing and more rational concept that tries to advance the RCC away from its ‘idealized’ state. The RDC states that streams and rivers have a continuous series disruptions along their paths (i.e., longitudinal disconnection), such as, beaver dams, log jams, landslides and similar structures that promote laterally connectivity to floodplains and creates storage of water. While these structures are intact, they increase habitat and biodiversity, channel stability, and the storage and biological processing of organic matter (E. Wohl, Geomorphology, 2014). Since the RCC
cannot accommodate this level of complexity, a new paradigm is required (D. Burchsted, BioScience, 2010).

Historically, Ohio and nearly all of North America’s streams and rivers were dominated by beavers and their impoundments (i.e., beaver ponds). The US Fish and Wildlife Service (USFWS) along with other agencies in their publication The Beaver Restoration Guidebook, Version 2.0, June 30, 2017, provides a map documenting the probable historic range of the North American beaver (refer to Figure 3). This map clearly indicates that all of Ohio was dominated by beavers. Literature suggests that pre-settlement beaver populations were as many as 400 million in North America and beaver impoundments varied from three (3) to eight (8) dams per mile within 1st, 2nd and 3rd order streams and were regularly found in 4th and 5th order streams. Leopold, Wolman and Miller in Fluvial Processes in Geomorphology, 1964, identifies the following average or typical relationships between stream order and drainage area:

<table>
<thead>
<tr>
<th>Stream Order</th>
<th>Drainage Area, square miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>1</td>
</tr>
<tr>
<td>2nd</td>
<td>4.7</td>
</tr>
<tr>
<td>3rd</td>
<td>23</td>
</tr>
<tr>
<td>4th</td>
<td>109</td>
</tr>
<tr>
<td>5th</td>
<td>518</td>
</tr>
</tbody>
</table>

Specifically, Gurnell describes beaver (Castor canadensis) as ecosystem engineers due to their ability to modify their habitat and this gives them enormous significance as geomorphic agents. Their consequent and direct impact on ecosystem structure and dynamics has also led them to be considered a keystone species. Gurnell goes on to say that where Castor canadensis remained unexploited, their activities influenced as much as 20 to 40% of the total length of 2nd to 5th order streams and can involve impressive scales of constructional activity (Angela Gurnell, Progress in Physical Geography, 1998). Burchsted states that given the beaver dominance of pre-colonial U.S. river systems, these conditions should be incorporated into restoration targets. (D. Burchsted, World Environmental and Water Resources Congress, 2010).

Greg Hood of the Skagit River System Cooperative located in Washington State ‘coined’ a rather kind term for the broad failure of biologists and Agencies not to recognize the role and influence of beavers and their impoundments on our watersheds as ecological amnesia. Researchers and academics across the U.S. and Canada have and are writing papers and documenting the importance of beavers and their impoundments, but these efforts are not changing our understanding at the regulatory level. For example, Joe Wheaton at Utah State University has a website (beaver.joewheaton.org) that provides numerous books and a list of well over 500 journal articles about beavers.

One of the books he lists is Three Against the Wilderness by Eric Collier, 1959, which was an international best seller. This book describes how Eric Collier and his wife, Lillian, in the 1920’s went to Eastern British Columbia (BC) to restore the beaver impoundments that Lillian’s grandmother, Lala, new as a young girl. Lala was a local native Indian that was born in 1830 and experienced the wealth of fish and wildlife in Eastern BC as a young girl with her people and then watched it all disappear after the beaver was trapped out by trappers/hunters. Once the beaver was gone, the beaver impoundments failed, the water was gone and so left the fish and wildlife. Near the time of Eric and Lillian’s marriage,
Lala cast a vision for them that if they restored the beaver impoundments then the fish and wildlife would return. This book documents Eric and Lillian’s first-hand account of restoring beaver impoundments and eventually beavers to their local watershed and the resulting benefits, which included their personal survival.

Another beaver educational tool is a video produced by PBS entitled “Leave It to Beavers.” This nearly one-hour long video explains the role and benefits of beavers and their impoundments in our watersheds and is available for watching on YouTube. We highly recommend this video.

In summary, the OCA requests and recommends that the OEPA:

1. Include a physical integrity stream assessment component to the stream assessment protocol in order to meet the objectives of the Clean Water Act, which includes making rational decisions regarding our streams and rivers. The physical integrity protocol needs to include a proven fluvial geomorphological assessment methodology, such as, the methodologies described by Dave Rosgen (1994, 1996, and 2001), and recommend by the USEPA, NRCS, USFWS, USFS and many others. A physical habitat assessment is not a physical integrity assessment. It is merely a habitat assessment.

2. Revise and correct the stream assessment protocol to be based on a River Discontinuum Concept (RDC) rather than a River Continuum Concept (RCC), and subsequently encourage and require the construction of in-stream impoundments that function more similar to beaver impoundments (e.g., leaky ponds) to store water in our watersheds and restore the fish, wildlife and plant diversity (i.e., habitat patches) that has historically existed in Ohio and most all of North America.

3. Delay or stop the advancement of the Credible Data Program and the Water Quality Certified Professional (WQCP) Program until such time that these two major water quality assessment program fallacies described above are corrected. Otherwise, these programs will merely add to the current confusing and confounding water quality stream assessments that are directly costing Ohio taxpayers and businesses while streams continue to be degraded and our watersheds area drained.

4. Diversify its 401 water quality assessment staff to include fluvial geomorphologists and hydraulic engineers so that a complete assessment of stream structure and functions is made and understood, and regulations are revised include these key principals. Stream structure and function is complex and it requires that the biology, geology and engineering departments work together in concert to assess, understand and resolve stream issues. One department alone cannot solve the complexity of stream issues that exists. That is, it requires the biological, chemical and physical integrity of streams to be understood.

Please contact the OCA for further discussion on these matters of great importance. Thank you.
Figure 1 – Lane Balance (Rosgen, 1996).
Figure 2 - Stream Channel Assessment and Classification Worksheet

Stream NAME: ___________________________ DATE: ____________
Basin NAME: ___________________________ DA: ______ acres ______ sq. miles
Location: ___________________________ Latitude: ____________
Section: ___________________________ Longitude: ____________
State Plane Coordinates: Northing: ____________
12-Digit HUC: Easting: ____________
Observers: ___________________________

1. Bankfull Width ($W_{bf}$)
   Width of stream channel at bankfull stage in a riffle section. ______ ft

2. Bankfull Cross-Section Area ($A_{bf}$)
   Area of stream cross-sectional area at bankfull stage in a riffle section. ______ ft$^2$

3. Mean Depth ($d_{mbf}$)
   Mean depth of stream channel cross-section at bankfull stage in a riffle section. ______ ft

4. Width / Depth Ratio ($W_{bf} / d_{bf}$)
   Bankfull width divide by mean depth in a riffle section. ______ ft / ft

5. Maximum Depth ($d_{mbf}$)
   Maximum depth of the bankfull channel cross-section in a riffle section. ______ ft

6. Lowest Bank Height (LBH)
   Lowest bank height on right or left bank that may be at or above bankfull stage. ______ ft

7. Bank Height Ratio (BHR) or Degree of Incision
   Ratio of lowest bank height of the cross-section divided by the maximum bankfull depth (LBH / $d_{mbf}$). ______ ft / ft

8. Width of Flood-Prone Area ($W_{fp}$)
   Twice maximum depth (2 x $d_{mbf}$) is the elevation at which the width of the floodprone area is determined in a riffle section. ______ ft

9. Entrenchment Ratio (ER)
   The ratio of the floodprone area width divided by the bankfull width ($W_{fp} / W_{bf}$) in a riffle section. ______ ft / ft

10. Channel Materials ($D_{so}$)
    The $D_{so}$ particle size represents the mean diameter of channel surface substrate between the bankfull stage and thalweg elevations. ______ mm

11. Water Surface Slope ($S_w$)
    Channel slope for a reach of approx. 20 to 30 bankfull channel widths in length with the 'riffle to riffle' slope representing the water surface slope at bankfull stage. ______ ft / ft

12. Channel Sinuosity (K)
    Ratio of stream length (SL) divided by the valley length (VL), or estimated from a ratio of valley slope divided by channel slope (VS/$S_w$). ______ ft / ft

13. Stream Type ___________________________
    {Refer to Stream Classification Key (Rosgen, 1996)}
Figure 3 – The probable historic range of the North America beaver (USFWS, 2017).