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2018 NATIONAL TRAINING WORKSHOP FOR CWA 303(d) LISTING & TMDL STAFF

SUCCESS IN THE SECOND HALF OF VISION IMPLEMENTATION

National Conservation Training Center
Shepherdstown, West Virginia
May 30 – June 1, 2018

FINAL PROJECT REPORT
&
TRAINING WORKSHOP PROCEEDINGS

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ELI maintains a companion website for this project: our CWA 303(d) Program Resource Center (http://www.eli.org/freshwater-ocean/state-tmdl-program-resource-center).

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I. INTRODUCTION

From May 30 through June 1, 2018, the Environmental Law Institute (ELI) convened the *2018 National Training Workshop for CWA 303(d) Listing and TMDL Staff: Success in the Second Half of Vision Implementation*. This event, supported through a cooperative agreement with the U.S. Environmental Protection Agency (EPA), brought together Clean Water Act (CWA) Section 303(d) listing and TMDL officials from all 50 states, the District of Columbia, the Commonwealth of the Northern Mariana Islands, Guam, and the U.S. Virgin Islands as well as water quality professionals from the Confederated Tribes of the Umatilla Indian Reservation, the Kalispel Tribe of Indians, the Lac du Flambeau Band of Lake Superior Chippewa Indians, the Taos Pueblo, and the Red Lake Band of Chippewa Indians. The assembled participants identified obstacles and learned proven and emerging approaches to achieving their goals for 2022. They presented on and discussed methods for addressing common programmatic problems related to nutrients, means of improving communication with stakeholders and the public, and how to better integrate CWA 303(d) Program efforts with those of the Permitting and Nonpoint Source Programs, among many other specific issues in breakout sessions. Participants also gained greater personal familiarity with colleagues from other jurisdictions, representatives of EPA Headquarters and the EPA regions, a representative of the Association of Clean Water Administrators (ACWA), and a representative of the New England Interstate Water Pollution Control Commission (NEIWPCC).

As with similar CWA 303(d) events of national scope convened in the spring of most years since 2008, ELI intended for this training workshop to provide a forum for program officials to learn about current best practices in listing, TMDL development, and TMDL implementation; to interact with one another; and to share their programmatic ideas and concerns. To ensure a planning process that would culminate in a training workshop attuned to the needs of program implementers in the states, tribes, and territories, ELI assembled a Workshop Planning Group (WPG). For six months, the WPG worked through a highly participatory process to develop, shape, and refine the workshop objectives and agenda, the structure and focus of workshop sessions, and the course materials.

The three-day training workshop was successful by the metrics of sharing useful information, generating new ideas, and building new relationships. Distinct takeaway messages emerged and are identified in Part II of this report. The bulk of the report, Part III, contains a detailed, session-by-session summary of event proceedings. Appendices to the report include the training workshop agenda, a list of participants, a full compilation of participant evaluations and comments, and information about ELI's companion website. ELI continues to build on the momentum and enthusiasm generated by this and the prior years' training workshops through an ELI-administered website for CWA 303(d) programs and through a listserv dedicated to state, tribal, and territorial professionals and designed to increase and enhance interactions among programs.

II. THEMES AND OTHER TAKEAWAYS

From the perspective of ELI staff in attendance, the following are significant themes, points, and observations that emerged over the course of the training workshop. They are not presented in a specific order, nor are they intended to reflect agreement among participants.

Nutrients are a huge problem nationally and a priority of many states and EPA.

- Nutrients are either the number one or number two cause of impairment for rivers and streams, lakes and reservoirs, and bays and estuaries in the country.

- One strategy for addressing the problem does not fit all nutrients scenarios.

Strategies and lessons exist for assessing and addressing nutrients-related problems.

- In the absence of numeric nutrient criteria, progress still can and should be made using narrative standards.

- Nutrients can be better addressed through TMDLs if wasteload allocations include stormwater and load allocations include assurances that nonpoint reductions will happen.

- Implementing nutrients TMDLs requires sustained engagement with the public and partners:
    - Early collaboration with stakeholders is important, especially when developing load allocations;
    - Scientifically defensible endpoints promote stakeholder buy-in;
    - Developing user-based goals holds significant promise; and
    - Communication with stakeholders is key to getting work done on the ground.

Effective communication is critical to CWA 303(d) Program success.

- A central role of the CWA 303(d) Program is to identify ways of achieving water quality goals and communicating them.

- The CWA 303(d) Program needs to not only reach but connect with stakeholders and the public, to the point that they understand the problem, why it is important, what is being done about it, and how they can participate.

- Communication and engagement can create transparency in water quality activities, prevent surprises when documents are issued, and create stakeholder ownership in the goals and products.

- Communicating successes and the unique role of the CWA 303(d) Program are vital for initial and sustained buy-in.

Communication and engagement efforts should be thoughtfully developed and executed.

- Pictures are key to successful communication.

- Text should be written for an audience with a secondary or even just elementary education.

- Engagement efforts will be more effective if the participants are contributing, not just receiving, information.

- Apps and other means of engagement should provide context, be useful in practice, resonate with a wide audience, and empower action and education.

- Developing a useful app is not enough, since advertising it is needed to get users. Advertising can take many forms, from videos and rack cards to news segments and articles.

- Receiving contact information along with data submissions is valuable, to thank first-time users and correct those submitting inappropriate material, as well as to track app usage.

- Digital documents, especially ones that fulfill legal requirements, should make it easy to print all of the underlying data.

Communication within the CWA 303(d) Program is important too.

- There is need for fora in which state, territorial, tribal, and EPA staff can share:
    - Tools that they have developed, so that everyone can access those products and ideas;
    - Modelling expertise, such as how to choose models, what to look for, how to work with contractors, and identifying red flags;
    - Stressor identification methods, including best practices, R codes, communication strategies, and presentations; and
    - Case studies and lists of methods, such as bacteria source tracking, fecal-to-E. coli translators, and assessment methods with narrative criteria.

- Preserving continuity through retirements, job changes, and shrinking budgets is increasingly challenging, highlighting the importance of training and sharing training resources.

- Trainings for state, tribal, territorial, EPA regional, and EPA Headquarters staff on developing and reviewing models are needed, since a major challenge to hiring modelers is that government staff may not be able to determine the appropriateness of the model.

- There is need for a TMDL 101 training, similar to the Water Quality Standards Academy.

- Communications trainings, especially how to communicate technical information to lay audiences, would be valuable.

- Trainings, a user group or listserv, and "packages" for working within R would help state, tribal, and territorial staff learn and work together in using R for data management, assessment, and reporting.

- A compiled list of state, regional, and territorial monitoring strategies would help communicate ideas and compare approaches. A safe space in which to compile monitoring failures would help too, since those experiences can be more informative than successes.

Better integration is necessary for better implementation.

- There is a whole suite of programs with which CWA 303(d) Program staff must be familiar because communication and coordination with those other programs is critical to success.

- From 2012 to 2017, 64 percent of CWA 319 funds spent on watershed-based-plan-guided projects (68 percent of such projects) went toward developing or implementing a TMDL.

- Roughly 80 percent of states will be updating their five-year Nonpoint Source Program plans in the next two years, presenting a prime opportunity for integration, including prioritizing waters, partnerships, and objectives.

- TMDLs should be permit-ready, easily understood by NPDES permit writers, and create innovative options for permitting.

If TMDLs provide the "math and the path," more detail is needed regarding the path.

- To better support nonpoint source implementation, TMDLs could:
    - Make load allocations more meaningful, in particular being more specific about BMPs needed on a sub-basin scale to meet it;
    - Improve source identification and quantification, including prioritizing which fields have the highest likelihood of delivering pollutants and the reductions necessary to meet water quality standards;
    - Include modeling details (e.g., internal loading and watershed loading – for load allocations) that otherwise might get merged or lost; and
    - Include implementation plans that meet the nine elements of a watershed-based plan.

- To better support point source implementation, TMDLs could:
    - Distribute the responsibility of meeting the wasteload allocation among the sources covered, and do so equitably – not that everyone receives the same limit, but everyone is evaluated in the same way;
    - Provide information in appendices about reductions needed to meet local versus downstream water quality; and
    - Facilitate point-nonpoint source trading by expressing load allocations as edge-of-field numbers.

Data can be a unifying force.

- The new version of the *How's My Waterway?* app pulls together data from many programs to provide the public with usable, meaningful information about water quality.

- The Water Quality Portal provides a way to download and filter data in a simple user interface, accessible for practitioners and the public.

- The role of the CWA 303(d) Program demands tremendous understanding of data across all CWA programs, especially with respect to permits and nonpoint source management, necessitating close partnership with those collecting data.

- Central to good monitoring data is synergies with partners. The need to answer specific questions with monitoring requires specific knowledge of the area, landscape, etc., and that includes the ability to work with and communicate with local partners and stakeholders.

- Citizen monitoring can assist a wide range of CWA program tasks.

Citizen science is increasingly important in water quality restoration and protection, and many lessons have been learned.

- Start small – geographically, number of volunteers, etc.

- It is essential to train and audit volunteers to ensure good data collection practices. Having different tiers of oversight and/or monitoring categories based on volunteers' level of training can work well.

- Trainings are more effective when using the sites the citizens plan to sample.

- Use pictures and videos to make conveying training information simple.

- Grants that cover lab work costs can remove a key barrier to getting data from citizen groups.

- A loaning library for meters helps equip volunteer monitors with the necessary technology.

- It is important to recognize and thank volunteers; small gestures go a long way.

There are still many informational and technical needs.

- The CWA 319 Program and the Grants Reporting and Tracking System (GRTS) should be better integrated into ATTAINS.

- The reporting functionality of ATTAINS should be improved, especially the visualization of data, particularly through GIS.

- The Water Quality Portal should better link data to QA/QC documents.

- The boundaries of tribal lands should be added to the Water Quality Portal's location selection.

- A repository of examples of models being used for TMDL development, along with their outcomes, pros and cons, etc., potentially in the form of a model selection matrix, would help in choosing an appropriate model for a specific application.

- A good overview of steady-state models versus mechanistic models would be useful.

- Data-sharing with the Natural Resources Conservation Service (NRCS) should be improved.

Up-to-date information can benefit all involved, improving efficiencies, demonstrating progress, and engaging stakeholders and communities. For that reason, one goal of the CWA 303(d) Program is to have all 2018 CWA 303(d) lists approved and in place before the start of the 2020 cycle, where practicable.

ATTAINS provides an opportunity to change the approach to Integrated Report submittals.

- The 2018 Integrated Reports are being submitted electronically through ATTAINS.

- EPA will be reviewing submissions electronically, and the submissions will include all administrative records/documentation.

- Spending time to get the initial submission accurate will make subsequent submissions easier.

Tribes could benefit from several types of EPA assistance.

- The ATTAINS pilot project with tribes should continue.

- Most tribes do not have a programmer on staff, so EPA assistance with programming could help them keep pace with technical advancements and open new opportunities.

- EPA could aid tribes in conducting data analysis.

- Tribes face a number of hurdles regarding CWA 303(d) implementation, including a lack of funding, and EPA can help find solutions.

- More communication and collaboration is needed regarding CWA 303(d) treatment in a manner similar to a state (TAS), especially with the EPA regions.

- EPA has provided tribes a draft TAS application template.

Flexibility by EPA and states/territories as well as the involvement of stakeholders are vital to a sound "alternative."

- "Alternatives" should have a plan explaining how water quality standards will be attained, with good milestones and good documentation, but the guidelines on "alternatives" are more of a tool than a checklist.

- EPA accepts "alternative" plans for recognition, but does not approve them.

- Stakeholder involvement is key for "alternatives". The more that stakeholders feel valued and heard, the more they will trust the state and want to stay involved.

States have undertaken a variety of protection practices, but questions remain as to what "protection" is under the CWA 303(d) Vision.

- There appear to be four "species" of protection in practice:
    - Protecting waters of higher quality;
    - Programmatic protection (a TMDL or an "alternative" covers unimpaired or unassessed waters);
    - Protection from impairment; and
    - Legacy protection (protection of restored waters, where the TMDL is used to maintain water quality after restoration).

- Clarity is needed regarding:
    - The terminology surrounding protection;
    - What qualifies as a protection plan;
    - How protection plans fit into the Integrated Report;
    - How protection plans will be tracked in ATTAINS;
    - Whether additional documentation is needed for TMDLs to be protective once water quality is restored; and
    - What funding sources may be used for protective activities.

The more that is known about water and the more collaborative the efforts to fix and protect it are, the more that will be accomplished.

III. WORKSHOP PROCEEDINGS: SESSION-BY-SESSION DISCUSSION

The following is an overview and detailed discussion of the training workshop, presented session by session. The full training workshop agenda appears in Appendix 1 of this report.

Welcome, Introductions, and Training Workshop Overview

Adam Schempp of ELI opened the tenth *National Training Workshop for CWA 303(d) Listing and TMDL Staff* by welcoming the many participants from across the country, including staff from all fifty states, the District of Columbia, three territories, five tribes, all ten EPA regions, EPA Headquarters, the New England Interstate Water Pollution Control Commission (NEIWPCC), and the Association of Clean Water Administrators (ACWA). Mr. Schempp emphasized that at the heart of the training workshops is the engagement of the participants, both inside and outside the classroom, and he urged everyone to make the most of the opportunity. A complete list of participants of this training workshop, including their affiliations and contact information, is provided in Appendix 2 of this report.

Mr. Schempp expressed thanks to the many people who helped plan the training workshop and acknowledged the multiple and varied contributions of Dwight Atkinson to the training workshop over the years and to water quality restoration and protection generally, congratulating him on his retirement. Mr. Schempp then introduced John Goodin for his opening remarks.

John Goodin, Acting Director of the Office of Wetlands, Oceans, and Watersheds at EPA Headquarters, began by thanking the individuals involved in organizing the training workshop and by noting how gratifying it is to be having the tenth such event, bringing together federal, state, tribal, territorial, and District of Columbia staff. Mr. Goodin explained that last year's training workshop fell only a few months into the new administration, at which point there was still notable uncertainty as to expectations regarding the CWA 303(d) Program. In the intervening time, he added, the arrival of the Assistant Administrator for Water helped to clarify some of the interests and priorities moving forward.

Mr. Goodin framed his comments using the concept of edges. In ecology, he explained, edges are where two or more distinct habitats come together – forest and field, coral reef and sand, wetland and open water – adding that edges are typically vibrant places. Mr. Goodin noted that these edges often are where the greatest productivity occurs, plants and animals taking advantage of offerings of both habitats. He added that edges also come with special challenges, as they are most prone to non-native species grabbing a foothold and, paradoxically, they often contain both generalists, that are highly adaptable to multiple situations, and specialists.

Mr. Goodin likened the CWA 303(d) Program to this edge concept in ecology, explaining that the work done in listing, TMDLs, and related areas of the program truly reflects this notion of what it means to be on an edge. At a minimum, he clarified, the program borders the big habitats of water quality standards and the underlying targets to be met as well as all of the implementation programs

– permitting, nonpoint source, and other entities translating into practice what the CWA 303(d) Program gives them. Mr. Goodin added that there is a fair amount of vibrancy to the program for that reason. There is a whole suite of programs with which CWA 303(d) Program staff must be familiar because communication and coordination with those other programs is critical. He noted that there is a great deal of productivity at this edge, much of which is reflected in the Vision, where the constructs of how to take this program to the next level are articulated. The themes from that Vision, continued Mr. Goodin, and the pursuits continued five years later reflect that productivity. It demands a tremendous amount in terms of program knowledge and demands an understanding of data, not only of CWA 303(d) Program matters, but with respect to permits and nonpoint source management. As a result, he added, the focus on ATTAINS and close partnership with those collecting data is key.

Returning to the edge metaphor, Mr. Goodin explained that there are many important players, and each player comes with a certain niche for this habitat, whether it is based in the states, tribes, or a particular program, and figuring out how to leverage those various niches is important to overall success. Ultimately, it demands communication, he declared; there is a premium on the ability to talk across programs and players, to make sure that CWA 303(d) staff are effectively communicating the translation of the underlying goals to ways of achieving them. Mr. Goodin added that the new administration has picked up on this in what they refer to as lean management. He clarified that it is not just undertaking lean efforts in how to be more effective, but how to manage in that way, and it requires a tremendous amount of communication.

Edges are not just geographic or spatial, Mr. Goodin continued; they are also temporal. One can return to a place in five years or fifteen years, and the habitat will have changed. He suggested that the CWA 303(d) Program has a temporal element as well, adding that the Vision has helped to build on the program's history and to look for ways to improve it moving forward. Mr. Goodin said that a number of themes characterize how the new administration is moving forward. One is "rule of law", back to the basics on statutory authorities. He explained how this has been a challenge. What does it mean to peel it all back and look at the black letter, to discern the opportunities provided and flexibility afforded? He noted that it can be both jarring and refreshing.

Mr. Goodin then addressed another theme, cooperative federalism, suggesting that the program had a head start and is three quarters of the way around the track. The program has an excellent system in place, he noted, not just with these training workshops, but a real, authentic commitment on the part of states, tribes, territories, and the EPA. He expressed his pride in those relationships, reiterating that there is strength on which to build. A third theme of the new administration, Mr. Goodin continued, is infrastructure, which has many manifestations, such as financing and efficiencies in permitting, not all of which are close to home for the CWA 303(d) Program. Yet, he explained, it is important to remember that the program is the translator that helps clarify the goals and targets sought, and that perspective is useful to the planning and permitting of the administration's priority infrastructure projects.

A particular point of emphasis for the new Assistant Administrator for Water, is nutrients, said Mr. Goodin. He added that this will be a key element of the portfolio of the new Deputy Assistant Administrator for Water. For this reason, Mr. Goodin expressed excitement in seeing that the training workshop agenda dedicates a significant amount of time to nutrients. While the CWA

303(d) Program does not have all the authorities, data, or money necessary to single-handedly address the problem, he emphasized the value of the program's convening power.

Just as with edges in ecology, explained Mr. Goodin, there are challenges in the CWA 303(d) Program. Not only is communication a premium in the program and with other programs, he added, but so is communicating successes and uniqueness of what the CWA 303(d) Program does. He emphasized the significance of this communication given the inevitable challenges of waning budgets, staff turnover, and litigation. Mr. Goodin explained his optimism, saying that the program has great resources, especially through cooperative efforts at various levels. He described them as solid foundations from which to work and models of cooperative federalism. Most importantly, he continued, it is about the people, and he highlighted the motivation he took from looking at the audience of staff assembled from across the country. Mr. Goodin noted the presence of edge generalists and edge specialists in the room, folks who dig in deep on a program and folks who touch multiple programs. So, he concluded, despite the challenges and other things that have the people of this program on edge regarding what the future holds, his view is that this group is on the edge of something great.

Jim Havard, Chief of the Watershed Branch of the Office of Wetlands, Oceans, and Watersheds, began his comments by thanking Mr. Goodin for his remarks and charge, and by thanking the Workshop Planning Group for their efforts in crafting the training workshop. Mr. Havard expressed his excitement at being back at this event with this group of people, adding that he is confident that the week will provide ideas, tools, and connections helpful in addressing the difficult challenges ahead.

Mr. Havard referenced the subtitle of the training workshop, "success in the second half of Vision implementation." He explained that the keystone of CWA 303(d) Program success is state priorities. Mr. Havard added that 45 states have identified nutrients as a Vision priority, which is part of the reason that a day of the training workshop focuses on nutrients. He also emphasized a focus on the tools available to aid implementation of the Vision over next few years.

Mr. Havard then alluded to the need to adapt. He said that EPA Headquarters has heard from many states that would like to tweak their priorities, which led to the open season starting in two weeks. During that time, states could work with their respective EPA regions to tweak their long-term Vision priorities. Mr. Havard added that 80 percent of states will be revising their nonpoint source plans over next two fiscal years, which creates an opportunity for cooperation. Informing their respective nonpoint source programs of CWA 303(d)-related efforts and priorities, and vice versa, could help in identifying and reaching common goals. He continued by suggesting that states not seek significant changes during the open season, but he acknowledged that evolving planning and unforeseen circumstances can necessitate some amendments to the long-term Vision priorities. He requested that states work with their regions, articulate a rationale, and engage the public.

Mr. Havard noted that one of the themes of the new administration is measures, that there is a heightened emphasis on performance and results measuring. He alluded to the CWA 303(d) Program's seven mission measures and highlighted the Thursday evening sessions focused on mission measures. Mr. Havard explained that EPA Headquarters staff are seeking to retain long-term Vision priorities as a significant component of measuring program success, and have

managed to do so thus far. Another component, he added, has been timeliness. He referenced Mr. Goodin's mention of black letter law, singling out the 30 days for EPA to review TMDLs. Mr. Havard said that one of the mission measures is how timely EPA is, and that the timeliness of Integrated Report submissions into ATTAINS is a measure of the states. He described this as an opportunity, noting that states and EPA often are timely, but there also are some significant backlogs. This is an as opportunity to catch up, he added. Mr. Havard proposed the goal of having all 2018 CWA 303(d) lists approved and in place before the start of the 2020 cycle. He explained that the up-to-date information can benefit all involved, improving efficiencies, demonstrating progress, and engaging stakeholders and communities.

Mr. Havard then turned his attention to the topic of engagement. He referenced the multiple data- and engagement-related sessions on the agenda as well as the stakeholder meeting in Denver a few months earlier on the *How's My Waterway?* app. He noted that the stakeholder meeting included participants from state agencies, federal agencies, local governments, NGOs, academia, utilities, and industry and produced constructive ideas about the app and communication in general. Mr. Havard highlighted the stakeholder preference for interactive elements and for being involved in the process. He alluded to progress being made with story maps, citizen science apps, modeling tools, and simple terminology.

Mr. Havard continued with more areas of program focus. He noted the work with tribes and suggested that the TAS breakout session on Thursday address the technical assistance that tribes might need from EPA. Mr. Havard also highlighted protection, identifying it as a goal of the Vision and a frontier garnering interest. He referenced the draft FAQs on protection, which lay out key terms, concepts, and expectations about the protection goal, adding that they will be available during the week and discussed at the protection breakout on Thursday. He emphasized that the compendium of practices by ELI in 2018 is focusing on protection, and that protection projects, including through the CWA 319 program, are underway, identifying techniques, identifying partners, and trying to create a protection community of practice. Mr. Havard concluded his list with reference to Heathy Watersheds accomplishments, explaining that preliminary healthy watershed assessments were completed in 48 states in 2017, and the Healthy Watershed Grants consortium has awarded 8 million dollars to 47 projects across 29 states.

Mr. Havard then took a moment to recognize Dwight Atkinson's accomplishments and announce the retirement of Doug Norton. He noted that Mr. Atkinson began his career at EPA in 1979, working in the air program before coming over to water. Mr. Havard highlighted three particular projects of Mr. Atkinson's: (1) he initiated using GIS mapping to identify forest watersheds most at risk to wildfires; (2) he initiated development and enhancement of atmospheric modeling and GIS to help identify source-specific mercury deposition; and (3) he developed the first nationwide projections of flow for streams and rivers for the remainder of the century. Mr. Havard then talked about Mr. Norton's career, explaining that he has been with the branch for 26 years as a senior environmental scientist, and that Mr. Norton's work has focused on the interface of science, geospatial data, and program support. Mr. Havard noted that Mr. Norton developed the Watershed Academy, the original *How's My Waterway?* app, and the recovery potential screening tool (and supported 38 states in using it); he also mapped watershed health and vulnerability with over 400 indicators across the country and has been serving as the EPA Healthy Watersheds Program

coordinator. He congratulated Dwight Atkinson and Doug Norton on their successful careers and retirements.

Mr. Havard continued by linking these developments to the broader theme of transition. He noted that 38 state, tribal, and territorial participants were first-timers to the training workshop. He emphasized that the program seeks to maintain continuity throughout these changes. Mr. Havard explained that a group of regional staff, led by Amy Feingold of EPA Region IV, has been collecting resources about the CWA 303(d) Program, from tools to useful summaries. He then highlighted the other evening session on Thursday, which focuses on potential trainings that would help improve this continuity. Mr. Havard suggested a TMDL 101 course, along the lines of the Water Quality Standards Academy, but for TMDL development. He also noted the modeling group webinars and ACWA's modeling workshop later in June.

Mr. Havard concluded his comments by emphasizing the importance of collaboration with partners and stakeholders as well as the use of strong science and data to move the program forward. He recommended bringing stakeholders together to share information, discuss challenges and opportunities, and think about ways to solve challenges together. He also highlighted the need to spark cooperation among governments in order to restore water quality. Mr. Havard suggested that water can connect communities, just as it brought everyone in the room together, adding that the more that is known about water and the more collaborative the efforts to fix it are, the more that will be accomplished.

Session 1: Nutrients Overview

The intended outcomes of the first session were:

- Participants will better understand the overall objective of the day's sessions.
- Participants will be more familiar with the details of the nutrients problem at a national level.

Adam Schempp of ELI opened the session by explaining the reason for a full-day focus on nutrients. He referenced comments after the 2017 training workshop requesting greater depth on an issue, and for more time on nutrients in particular; the widespread interest in nutrients leading up to that event; and the large number of states that identified nutrients as a priority. Mr. Schempp then provided the story arc for the day, starting with this session, a national overview of the subject with remarks by Tom Wall. He said it would lead into breakout sessions, each focusing on a particular nutrient-related challenge, followed by a report-back session. The day concludes, he added, with sessions focused on implementation, from a nonpoint source perspective and from a permitting perspective.

Mr. Schempp indicated that the agenda for the day sought to fulfill another request, to talk more about solutions than challenges. The breakouts center around six critical questions, he noted, and while the details of nutrient challenges vary considerably from place to place, the discussions will focus on strategies for addressing them. Silver bullets are uncommon, Mr. Schempp continued; the answer almost always is, "it depends." He cautioned against that answer, as it may not be the best means of achieving solutions or endearing oneself to the public. Mr. Schempp suggested that

not all insights will be universally applicable, but that all experiences are building blocks that can help other people in the group.

Mr. Schempp charged the participants with communicating their knowledge and experience, assembling all those concepts, and advancing new ideas about how to move forward. He asked them to be willing to be innovative, to put new concepts on the table. Mr. Schempp emphasized that these training workshops rely on participation, that participants do not need to have "the" answer, but to please share generously if they have "an" answer.

Mr. Schempp then introduced Tom Wall for his remarks.

Tom Wall, Director of the Watershed Restoration, Assessment and Protection Division of the Office of Wetlands, Oceans, and Watersheds: The National Perspective on Nutrients

Mr. Wall began by reiterating that nutrients were a big priority for past administrations and continue to be for the current one, noting that Dave Ross, the new Assistant Administrator for Water, has said that he really wants to make progress on long-term nutrients goals. Mr. Wall noted that the former Secretary of Agriculture of Iowa now heads the USDA conservation programs, and that he is eager to re-up commitments to the National Water Quality Initiative (see https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/water/?cid=stelprdb1047761) and Mississippi River Basin Healthy Watersheds Initiative (see https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/home/?cid=STELPRDB1048200), adding that they are great opportunities to engage people and work with USDA to make progress.

Mr. Wall explained that nutrients are a huge problem nationally, with roughly half of all streams in the country having medium to high levels of nitrogen and/or phosphorus, approximately five million lake acres identified as threatened or impaired for nutrients, and over three-quarters of assessed coastal areas exhibiting signs of eutrophication. He added that over 17,000 waterbodies do not meet state water quality standards because of excess nutrient pollution, and half of all waters are not even assessed fully enough to make a judgment about quality. Mr. Wall highlighted the impacts of these impairments, from public health risks, to environmental damage, to economic losses. He said that, unfortunately, less visible problems tend not to motivate people the same way as reservoir contamination or beach closures do.

Mr. Wall provided several lists drawn from EPA's national summary of integrated state water quality reports and/or CWA 303(d) lists and CWA 305(b) reports that show nutrients are a top cause of water quality impairments, either the number one or number two cause of impairment for rivers and streams, lakes and reservoirs, and bays and estuaries nationally. He added that not all states have nutrient criteria for all waterbody types, so EPA considers organic enrichment/oxygen depletion, ammonia, algal growth, and noxious aquatic plants to be nutrient-related. Mr. Wall noted that over 9,000 TMDLs have been developed for nutrients or nutrient-related impairments, and that implementing many of them is a real challenge requiring sustained engagement with the public and partners. It is a vital time for the program, he added; after four decades of having priorities set by litigation, the Vision provides a chance to work

with stakeholders to set the priorities. For almost every state, nutrient pollution is among the highest priorities.

Mr. Wall then provided an overview of some of the relevant national program guidance. He explained that the running message has been, yes, keep working on nutrient criteria, but many states have faced challenges getting criteria in place. Mr. Wall emphasized that a lack of those criteria does not mean that progress cannot be made in the meantime. He suggested continuing to use narrative standards, and to even go beyond monitoring information, to use photos from stakeholders showing excessive, objectionable algae mass, for example.

Mr. Wall then listed several opportunities for TMDL programs to address nutrients. He said that interpreting narratives in listings is a way to make progress. He added that engaging stakeholders with models and other science to understand water quality conditions and identify sources and solutions can help demonstrate how to achieve reductions and where to focus in order to achieve water quality goals. Mr. Wall suggested developing wasteload allocations that include stormwater, where it is a significant contributor to nutrient loads and the allocation can be translated into actionable permit limits or conditions. He also suggested developing load allocations that include realistic assurances that nonpoint reductions will happen. Finally, he stressed that achieving water quality goals requires engagement and collaboration with partners and stakeholders as well as promoting cooperation.

Mr. Wall then charged the participants with taking advantage of the plenary and breakout sessions of the day, to share experiences, learn from each other, and ultimately advance the discussion on nutrients. He asked what their experiences have been in figuring out the right plan for making progress in their communities. He noted that when a large capital investment is needed by point sources, a TMDL almost always is the right approach to provide a strong framework for those costly investments, but there are places where alternatives can really engage stakeholders. Mr. Wall also asked about protection, adding that many states have made great progress developing protection plans. He emphasized the importance of integration among programs, referencing accomplishments in Wisconsin as an example of creative approaches to make strong incremental progress toward long-term goals. Mr. Wall also suggested improving engagement, highlighting the value of building farmers' trust. Finally, Mr. Wall referenced the importance models of appropriate complexity and tools such as recovery potential and healthy watershed screening to help set priorities.

Mr. Wall then fielded a couple of questions from the participants. A state participant asked whether Mr. Wall had heard feedback from national environmental groups on state plans and what those groups seek, now that the Vision is at the half-way point. Mr. Wall said that EPA Headquarters had not heard much from those groups regarding the Vision, but he noted that there had been many lawsuits, particularly regarding individual listing decisions and TMDLs. He added that there is still much work to do in some places to convince all stakeholders that the states have a plan to embrace and not litigate. A federal participant asked whether the administration would consider upgrading standards and refinancing secondary treatment, even for not-so-tight permit limits. Mr. Wall responded that, in 2012, EPA denied a petition to add technology-based nutrient limits as part of secondary treatment standards. In terms of financing, he noted continued availability of financing through state revolving loan funds and a new authority for federal water infrastructure

loan guarantees that, in the first round of funding, that leveraged a small federal guarantee to support more than a billion dollars in private investment. He noted that EPA is now working on a statistically valid survey to document the degree to which secondary sewage treatment plants can optimize their performance in reducing nutrients, and what factors make some sources achieve much more reduction than others. The study may provide information that states and communities can use to help other plants to improve their performance.

Key Points Raised:

- Nutrients are a huge problem nationally and are a priority of the current administration, just as they have been for prior administrations.
- Roughly half of all streams in the country have medium to high levels of nitrogen and/or phosphorus; approximately five million lake acres are identified as threatened or impaired for nutrients; and over three-quarters of assessed coastal areas exhibit signs of eutrophication.
- Nutrients are either the number one or number two cause of impairment for rivers and streams, lakes and reservoirs, and bays and estuaries in the country.
- Implementing the over 9,000 TMDLs for nutrients requires sustained engagement with the public and partners.
- A lack of numeric nutrient criteria does not mean that progress cannot be made; keep using narrative standards in the meantime.
- Nutrients can be better addressed through TMDLs if wasteload allocations include stormwater where that is a significant source of nutrient loads and load allocations include assurances that nonpoint reductions will happen.
- Engaging and working with the agricultural community and their trusted advisors such as agricultural retailers, certified crop advisors, and land grant universities is vital to making progress on reducing nutrient loads from the agriculture sector.

Session 2: Nutrients Breakouts

This session consisted of six breakout groups, each addressing a different common programmatic problem related to nutrients.

Prior to the training workshop, ELI, with the help of the Workshop Planning Group (WPG), assembled a list of nutrients-related challenges. Through the registration materials, participants indicated their discussion preferences from among these topics. ELI selected the most popular six topics:

- How can waters best be assessed for nutrient impacts using narrative criteria?
- How can the role of nutrients best be captured in biological impairments?
- How can nutrient TMDLs best be developed as a translation of a narrative standard, generally?
- What is the best way to develop nutrient TMDLs for algae-related impairments in lakes?
- How do you best allocate nutrient load with mixed sources?

- What steps are helpful to take in developing "alternatives" for nutrient impairments?

ELI, with the help of the WPG, chose a facilitator and reporter for each of these breakouts and, in collaboration with the facilitator, developed an agenda and discussion questions for each breakout. In the weeks leading up to the training workshop, ELI sought the preferences of each registered participant from among the six options and then assigned participants to groups according to those expressed preferences.

During this session, participants sought to answer the central question presented to their breakout group, framed by presentations and/or a series of supplementary discussion questions.

Session 3: Report Back and Discussion

This session consisted of six brief presentations by the reporters of each of the breakout groups. The presentations summarized the discussions and answers from their respective groups, and a brief facilitated discussion followed several of the presentations. The intended outcomes of this and the prior session included:

- Participants will be more familiar with the strategies that others have used to address certain nutrient-related programmatic challenges, what has worked and not worked, and why.
- Participants will have developed new strategies for addressing these programmatic challenges.

(1) Kim Cenno, NJ: How can waters best be assessed for nutrient impacts using narrative criteria?

Ms. Cenno began her report by noting that participants from Alabama, Pennsylvania, Kansas, and New Mexico opened that breakout session with presentations on how their respective states assess for nutrient impacts using narrative criteria. She explained that the theme that emerged was that developing narrative criteria is a protective strategy, whereas developing numeric criteria is a reactive strategy. Ms. Cenno then listed various strengths of the narrative approach: it allows work to be done on the ground sooner than if a rulemaking is undertaken to develop numeric criteria; it is a practical approach, making it easier to work directly with stakeholders, with a greater degree of communication as to what needs to get done to address the nutrient impacts; the assessment protocols are an important component of EPA's list review and, thus, lend themselves to public process; and finally, it can build a strong body of evidence while working toward numeric criteria.

Ms. Cenno then turned to the challenges of assessing nutrient impacts using narrative criteria. She acknowledged that the group did not resolve how to put narrative criteria into a NPDES permit. She added that the task is much easier with numeric criteria. Another challenge, explained Ms. Cenno, is the resource-intensive monitoring required to establish causality. She advocated for addressing the problem before it begins, saving time and money in the long run. She added that some states went straight to installing best management practices, in lieu of monitoring. Ms. Cenno implied that the criteria need to be site specific, to reduce the risk of litigation.

Ms. Cenno also listed a few solutions. She noted that communication with stakeholders is key in order to get work done on the ground, a sentiment supported by the fact that all four presentations to start the breakout included reference to the role of community stakeholders in the planning process. Another solution, continued Ms. Cenno, is to link narrative criteria to other endpoints such as recreational designated uses. She also referenced EPA resources, such as N-STEPS, that can help states develop numeric criteria by doing literature and statistical legwork to form thresholds and defensibility.

In conclusion, Ms. Cenno emphasized that one strategy does not fit all nutrients scenarios, adding that site-specific criteria and endpoints are important. She also suggested that participants be cognizant of upstream and downstream connectivity, even in different states. Ms. Cenno said that narrative criteria, and the approaches to assess waters with them, begin with communication and developing a body of evidence. Finally, she highlighted that using narrative criteria can result in measurable improvement in water bodies, and many states in the breakout agreed that using narrative criteria is a good strategy.

(2) Alan Wittmuss, SD: How can the role of nutrients best be captured in biological impairments?

Mr. Wittmuss said that the breakout on capturing the role of nutrients in biological impairments focused heavily on data needs. He explained that participants from Florida, Indiana, and EPA Headquarters presented on the issue. Indiana evaluates aquatic life use, and Florida evaluates total nitrogen concentration, total phosphorus concentration, chlorophyll-a, periphyton, macrophytes, and macroinvertebrates, but both states are still working on refining their respective approaches. Mr. Wittmuss emphasized the need to set scientifically defensible endpoints, or else stakeholders may not go along with it. He added that they discussed means of incorporating this into the CWA 303(d) Vision.

Mr. Wittmuss explained that the EPA Headquarters participant detailed an extensive literature review on the subject, specifically total nitrogen and total phosphorus relationships in articles. He noted that there was a strict set of criteria for looking at relationships, and the focus was on benthic invertebrates and macrophytes. Mr. Wittmuss said that very few states are doing this kind of a matrix, and with no TMDLs having yet been developed based on biological criteria, it is difficult to know whether the process works.

An EPA participant asked whether the N-STEPS program covers biological indices or just concentrations, to which another EPA participant answered that the N-STEPS program helps states and tribes develop numeric criteria and translate narrative criteria for nitrogen and phosphorus for lakes, rivers, and estuaries. He added that they use state data to build models to understand how biomass changes in response to nutrients. He said that they look at macroinvertabrates and dissolved oxygen as well as algae.

An EPA participant sought clarification on the point about no TMDLs having been developed using biological matrices, specifically whether the endpoint of TMDLs had not been biological or the initial listing had not been based on biology. Mr. Wittmuss replied that the stressor is something that must be fixed in order to see the biological criteria change, adding that his state has listed based on biological impairment. A state participant noted that her state has a biologically based

approach for phosphorus, that it is a loading based on land uses to make an enrichment factor. She said that they calculate for changes in the periphyton community, from pollution-sensitive and pollution-tolerant species. They use that to set an enrichment factor and try to get back to the original community. She acknowledged that it looks like a TMDL, but they have not listed it as a TMDL.

(3) Dave Werbach, EPA Region 5: How can nutrient TMDLs best be developed as a translation of a narrative standard, generally?

Mr. Werbach explained that the breakout focusing on how nutrient TMDLs can best be developed as a translation of a narrative standard began with three presentations, the takeaway from which was that it is possible, but not everyone can do it. Most notable among the list of impediments, he continued, is the lack of data. Mr. Werbach said that linking nutrients and biology is tough, requiring not only a lot of data, but the right data. He added that political will is a challenge to TMDL development, as small facilities are concerned about the potential economic impact if they are found to be significant contributors to the problem. Thus, as was mentioned in the prior report, the result needs to be scientifically defensible.

Mr. Werbach stressed the importance of flexibility, especially on the part of EPA. He said that he was surprised at the number of states utilizing other processes, through biology, pH, and chlorophyll-a. Mr. Werbach added that there is no one-size-fits-all approach in this area. He referenced the many approaches focusing on reductions as well as the iterative processes being employed: actions followed by assessments, repeated.

(4) Trish Rielly, MO: What is the best way to develop nutrient TMDLs for algae-related impairments in lakes?

Ms. Rielly began her report by noting that the sole presentation, from the participant from Wisconsin, covered TMDL development for four shallow lakes that had a lot of mixing. She explained that the state developed two sets of water quality criteria: (1) site-specific criteria based on citizen surveys and recreational use and; (2) numeric criteria. The approach garnered interest from the other participants. Ms. Rielly also said that the TMDLs for the lakes had a phased approach: completed aquatic plant restoration would reduce the load allocation by 25 percent, to account for aquatic vegetation that would reduce the amount of internal loading, but the full load allocation would be used if improvements were not being made through aquatic plant restoration.

Ms. Rielly added that the subsequent discussion emphasized that there is no set way to develop a lake TMDL, no one-size-fits-all approach. She stressed the value of lake models that provide what is needed to develop a TMDL for a particular lake. The complexity of the lake system, she explained, could raise or lower the necessary complexity of the model. Ms. Rielly said that they talked about several different models, and that a basic model could provide much of the information necessary and justify the need for a more complex model.

Ms. Rielly noted challenges with hiring modelers, including that the state staff may not have the expertise to review the model and determine whether it is accurate. For this reason, she

continued, there is a need to develop trainings for state, tribal, territorial, EPA regional, and EPA Headquarters staff on the development and review of models. Ms. Rielly referenced the training in Denver, which excited some states, but others do not have the resources to support staff attendance. Thus, she emphasized, funding and additional means of conveying the information are necessary.

An EPA participant inquired as to the extent to which lake TMDL models are oriented toward algal impairments or algal dominance. He also asked to what extent the models are taking into account the physiology of cyanobacteria, noting that certain cyanobacteria in oligotrophic lakes have a life stage where they can access phosphorous and becomes more buoyant. Another EPA participant replied that several of the continuous models have changes built into them. A third EPA participant said that, while almost the entire breakout discussion focused on TMDLs, the example that kicked off the breakout was the idea of employing user surveys to set an appropriate chlorophyll-a number, tying health to nutrients. He was optimistic that there are additional opportunities in that line of thinking. The first EPA participant to speak responded that they are working on a product oriented around developing user-based goals, including those of lake users.

(5) Randee Tubal, HI: How do you best allocate nutrient load with mixed sources?

Ms. Tubal explained that the breakout on allocating nutrient load with mixed sources had no presentations and was designed as purely a roundtable discussion. She said that they discussed a wide range of mixed-use watersheds, from predominantly agricultural to predominantly urban. Ms. Tubal described the breakout as having four topics. The first one covered the approaches taken to assessing mixed sources, whether more individual or watershed-based. She noted that most participants said the latter. Ms. Tubal added that the discussion emphasized the need for equity when distributing loads, not that everyone receives the same limit, but everyone is evaluated in the same way. For example, she continued, Tennessee uses a model that uses background concentrations of pollutants to calculate the reductions needed.

Ms. Tubal labeled the second topic as the strategies being used to meet water quality goals, whether managing at various points throughout the watershed or pour points. The consensus was various points. The third topic, she continued, concerned tools. Ms. Tubal said that many states have trading programs in place or in development, but that use of them commonly is scarce due to resource constraints. Connecticut's trading program among point sources was highlighted as one of the longest running and most used. Ms. Tubal defined the fourth topic as other considerations, whether states use total phosphorus, orthophosphate, or species, and communication strategies. She concluded by recommending early collaboration with stakeholders, especially for load allocations.

(6) Chris Hunter, EPA HQ: What steps are helpful to take in developing "alternatives" for nutrient impairments?

Mr. Hunter explained that the "alternatives" breakout began with presentations of examples from participants from three states, Florida, Pennsylvania, and Tennessee. He acknowledged that "alternatives" are still an unknown quantity to some states, which led to some of the breakout being focused on terminology. Mr. Hunter described "alternatives" as being about

flexibility not formula. He emphasized the need for flexibility on the part of states and EPA. He said that "alternatives" are not a one-size-fits-all option, but they do provide opportunity when people sit down and assess the situation.

Mr. Hunter noted the challenge in identifying when an "alternative" is done being developed or implemented. He added that no "alternative" plan has been fully implemented to the point that an impairment being removed yet, but working with EPA is essential to making sure that everyone is on board. Mr. Hunter also stressed the importance of having a plan with good milestones and good documentation. He noted that there had been a few cases to date where "alternatives" were expected to have stakeholder involvement and energy to make improvements where TMDLs might not. Getting stakeholder energy involved, he continued, is key to "alternative" plans, especially when those stakeholders are respected among their peers. Mr. Hunter relayed that some states with some upfront investments have had stakeholders coming to ask if they can help develop "alternative" plans. He concluded by reiterating that flexibility, stakeholder involvement, and the involvement of those with credibility in the community are vital to a sound "alternative."

Key Points[1] Raised:

- One strategy for addressing the problem does not fit all nutrients scenarios.
- Linking nutrients and biology is tough, requiring not only a lot of data, but the right data.
- Scientifically defensible endpoints promote stakeholder buy-in.
- Developing user-based goals holds significant promise.
- Communication with stakeholders is key to getting work done on the ground.
- Early collaboration with stakeholders is important, especially when developing load allocations.
- The benefits of using narrative criteria for assessing the impacts of nutrients (at least in the near term) include:
    - It allows work to be done on the ground sooner than if a rulemaking is undertaken to develop numeric criteria;
    - It can be used to build a strong body of evidence while working toward numeric criteria;
    - It is a practical approach, making it easier to work directly with stakeholders, with a greater degree of communication as to what needs to get done to address the nutrient impacts; and
    - The assessment protocols are taken into consideration as EPA conducts list review and, thus, lend themselves to public process.
- Using site-specific criteria and linking those criteria to other endpoints, such as recreational designated uses, are helpful approaches to nutrient-related assessments.
- The most helpful lake models are those that provide what is needed to develop a TMDL for a particular lake.
- Trainings for state, tribal, territorial, EPA regional, and EPA Headquarters staff on developing and reviewing models are needed, since a major challenge to hiring modelers is that government staff may not be able to determine the appropriateness of the model.

[1] These "Key Points" come only from the report-backs and subsequent discussion. Many other points were made in the breakout sessions, but since notes were not taken in those sessions, not all of those points are reflected here.

- There should be equity when distributing loads, not that everyone receives the same limit, but everyone is evaluated in the same way.
- "Alternatives" should have a plan with good milestones and good documentation.
- Flexibility by states and EPA as well as the involvement of stakeholders with credibility in the community are vital to a sound "alternative."
- EPA resources, such as N-STEPS, can help states and tribes develop numeric criteria by doing literature and statistical legwork to form thresholds.

Session 4: Supporting Nonpoint Source Implementation

This session centered around a panel of CWA 303(d) and Nonpoint Source Program staff from five states, each with experience in the two programs, and was prefaced by a brief presentation from Lynda Hall of the Nonpoint Source Program at EPA Headquarters. The intended outcomes of this session included:

- Participants will be more familiar with various ways in which the CWA 303(d) Program effectively supports the restoration efforts of the Nonpoint Source Program.
- Participants will have gained tips for working with the Nonpoint Source Program.

Lynda Hall, EPA HQ: §319 Nonpoint Source and TMDLs Co-Implementation

Ms. Hall opened the session by thanking the participants and training workshop organizers for their focus on implementation. She added that she is very supportive of integration between the CWA 303(d) and CWA 319 Programs and has participated in many such conversations. Ms. Hall suggested that, in an ideal world, the analytic components of TMDLs guide nonpoint source planning and implementation efforts, with the CWA 319 Program providing resources at the watershed scale and engaging stakeholders. Yet, she explained, that does not just happen; as they are two different programs with different histories. She expressed her interest in the perspectives on integration that would be shared in the session.

Ms. Hall then turned her attention to nutrients specifically. She presented details as to the prevalence of nutrients issues in the portfolio of CWA 319 projects: from 2000 to 2016, 82 percent of the over 5,800 CWA 319-funded projects explicitly addressed nutrient impairments, and another 8 percent addressed pathogens, which often co-control nutrients. Ms. Hall explained that, since 2006, 153 waters have been restored for nutrient-related impairments through these efforts, covering roughly 80,000 acres of lakes, ponds, and reservoirs and roughly 1,500 miles of rivers and streams. She added that roughly 20 percent of the Nonpoint Source Program Success Stories concerned nutrient impairments. Her takeaway from these experiences was that addressing nutrients, particularly to the point of meeting water quality standards, is difficult and takes a long time, but progress is being made.

Ms. Hall continued by highlighting the nexus to date between TMDLs and the CWA 319 Program. She noted that 64 percent of CWA 319 funds spent on watershed-based-plan-guided projects (68 percent of such projects) from 2012 to 2017 went toward developing or implementing a TMDL. Of the 35 Success Stories reported in 2017, 22 of them concerned waters with a TMDL, addressing and removing 57 CWA 303(d) impairments. Ms. Hall

concluded her comments by recommending that participants take advantage of the forthcoming updates to the five-year Nonpoint Source Program road maps, adding that 80 percent of states will be undergoing this update. She especially emphasized the prioritization of waters, partnerships, and objectives that occur during this period, presenting a prime opportunity of continuing integration with the CWA 303(d) Program.

A state participant said that the identified objectives for developing "alternatives" do not align well with the nine elements of a watershed-based plan. He asked Ms. Hall whether the expectations for each document could be matched up better, to which Ms. Hall responded that she thought it was a good suggestion. An EPA participant also responded that there is significant connection between "alternatives" and watershed-based plans, but they would like to know where challenges and gaps exist. The state participant replied that he would provide details about the challenges they are facing. Another EPA participant suggested that how closely the two may parallel depends on the perspective of the EPA regional nonpoint source coordinator, noting that the one for her region does not view them as equal. The EPA participant recommended starting an open dialogue on the topic. A third EPA participant said that he sees differences between the two, that watershed-based plans have explicit components that must be met.

Mr. Schempp then transitioned the focus of the session to the panel of state staff with experience in both the CWA 303(d) and CWA 319 Programs. The panelists introduced themselves, providing their program affiliations over time and a description of how their respective states structure the programs relative to one another.

Trish Rielly works for the Missouri Department of Natural Resources. She worked in the CWA 319 Program, then moved to water quality monitoring and assessment, and recently back to the CWA 319 Program as the Unit Chief. She explained that both the CWA 303(d) and CWA 319 Programs are housed in the Division of Environmental Quality of the Department of Natural Resources, but four years earlier the CWA 319 Program moved from the Watershed Protection Section, where the CWA 303(d) Program is housed, to the Soil and Water Conservation Program.

Carl Adams manages the Watershed Protection Section of the Division of Water Quality in Utah's Department of Environmental Quality. He explained that roughly twelve years earlier the CWA 319 Program was split from the assessment portion of the CWA 303(d) Program and joined with the TMDL portion under the Watershed Protection Section. Mr. Adams noted that the structure has worked rather well, helping the TMDL staff gain an appreciation of the implementation challenges, and it has increased credibility with stakeholders.

Chris Janssen started at the Kansas Department of Health and Environment in the CWA 303(d) Program but transitioned to lead the CWA 319 Program in 2017. He explained that the two programs are housed within the same division but recently had been separated into two different bureaus.

Ben Rau manages the Watershed Planning Unit, which houses both the TMDL and CWA 319 Programs, in the Washington State Department of Ecology. He explained that they have started

to write position descriptions that include both nonpoint source and TMDL responsibilities, to unify those obligations in the same people.

Kevin Kirsch originally was hired at the Wisconsin Department of Natural Resources in the CWA 319 Program. He explained that the CWA 319 and CWA 303(d) Programs were in the same division and bureau, but they split via lean programs. When that split occurred, he was brought to the CWA 303(d) Program. Mr. Kirsch noted that the two programs have managed to stay integrated through regular meetings of a team of non-point source staff, permitting staff, groundwater staff, and TMDL staff, adding that there is nonpoint source representation in the development of all TMDLs.

Mr. Schempp posed the first discussion question to the panelists: what have been key elements of a good working relationship between the CWA 303(d) and CWA 319 Programs?

Ms. Rielly responded that, while the two programs are in different organizational areas, they are physically located across an aisle from one another. She noted that staff from the two programs work with each other extensively, adding that the TMDL Program provides the CWA 319 Program with modeling support for watershed management plans and provides critical area maps. Ms. Rielly highlighted the value that the TMDL Program has provided in working with stakeholders in plan development, ensuring that the plans read properly and that the stakeholders interpret them correctly. She also explained that the CWA 319 Program reviews TMDLs and implementation plans, and the TMDL Program provides feedback on applications for CWA 319 funding.

Mr. Rau said that this integration is at the heart of why the State of Washington has positioned both programs in the same unit and have staffers do both nonpoint and TMDL work. He referenced a conversation with his predecessor, Helen Bresler, in which she made the point that everyone in the unit has a secret identity, as a watershed cleanup specialist; they are not to think of themselves as CWA 319 or CWA 303(d), rather that their jobs are to figure out the best ways to get to clean water, and only then to figure out the best tool to achieve it.

Mr. Janssen explained that successful watershed plans relied on existing TMDLs. He added that the recognition of that fact, as well as the sharing of delisting information, is vital. Mr. Janssen noted that he has learned not to ask for every step in the process when seeking modeling help from the TMDL Program. He said that he understands the data enough to do some of the analysis, which relieves some of the burden of the request. Charm and a smile help too, he quipped, as does sharing funding.

Mr. Adams emphasized shared goals, that clean water is the objective of both programs helps the working relationship. He also referenced work by the TMDL Program with local watershed coordinators in monitoring and source identification, which also helps focus nonpoint source work.

Mr. Schempp then asked the participants in the audience for their experiences, keys to good working relationships between the CWA 319 and CWA 303(d) Programs. An EPA participant referenced the experience of two states in his region trying to address impairments in a shared river

through a series of face-to-face meetings between CWA 319 and CWA 303(d) staff from each state. He attributed the success of the effort to everyone's willingness to find where common interests lie and to first understand before seeking to be understood. He added that EPA resources that supported the necessary modeling helped as well. The EPA participant also suggested that the CWA 303(d) Program should do a better job of source identification and quantification, especially from nonpoint sources. He said that this historically has been back-calculated, which, when handed over to CWA 319 Program staff, does not help with implementation.

Another EPA participant extolled the virtues of having staff with responsibilities in both programs. Even though his region was forced to do so because of budget cuts, the resulting familiarity with both programs in a single staffer proved advantageous. He added that they are doing something similar with the permitting program. The EPA participant then turned to an example from his region. He attributed much of the nonpoint source progress on a major lake to the reasonable assurance portion of the applicable TMDL. He noted that the state consequently developed new regulatory authorities on several aspects of nonpoint source pollution, which was the largest source of phosphorous to the lake. He added that the number of state agricultural inspectors increased from one to eight, and the USDA chipped in to fund agricultural BMPs.

A state participant reiterated the value of staff working on both TMDLs and other program tasks, including monitoring, assessment, and water quality standards. She noted that funding has caused the diverse responsibilities in her state but emphasized its benefits. Another state participant explained that, when they develop TMDLs, the implementation plan must meet the nine elements of a watershed-based plan. Instead of having two people review it, he added, they work together and with stakeholders, develop one report, and proceed to implementation.

An EPA participant highlighted the impact that working with the Farm Bureau had on the success of a project because of their skill in messaging and influence and credibility with farmers. Mr. Schempp emphasized the importance of partners for messaging, whether the CWA 319 Program, the USDA, local entities, or others. A state participant acknowledged the value of working with organizations such as the Farm Bureau but also cautioned against simply handing over the role of stakeholder communication and engagement to them. In his experience, he added, the Farm Bureau, USDA, and conservation districts have worked to get some improvement, but they have not been that helpful in meeting water quality standards because their interests are not aligned with the state's to that extent.

Mr. Schempp then shifted the focus of the session from what has been done to what could be done by the CWA 303(d) Program to better help nonpoint source efforts.

Mr. Kirsch suggested "meaningful" load allocations, a concept that Wisconsin recently started implementing. He explained that, when they develop a basin-wide TMDL, they can craft load allocations on a sub-basin scale, even expressing it as an edge-of-field number, using the same modeling software used by nutrient management specialists when they develop plans. Mr. Kirsch added that they can prioritize which fields within the HUC-12 have the highest likelihood of delivering pollutants, and what they need to get down to in order to meet water quality standards, which allows some targeting of resources.

Mr. Adams said that they have been trying to shift the approach in rural Utah away from random acts of conservation and toward explicit issues and goals. He provided the example of a reservoir TMDL developed in 2004 that sat on a shelf with regard to nonpoint source implementation until the conservation district got a new chairman who picked it up and wanted to do something about it. After four years and four million dollars, much of which was NRCS money, the problem was completely addressed. Mr. Adams suggested patience in using TMDLs to initiate action and being flexible enough to capitalize on opportunities as they present themselves.

Mr. Janssen recounted that he asked around his office for an answer to this question and got what he expected: more data more regularly. He noted that watershed groups and other stakeholders who know the goal toward which they are striving want to know every few months or even weeks whether the water is getting better. Mr. Janssen acknowledged that it is hard to explain not seeing a trend. A little more targeted sampling post-BMPs will help a little more, he said.

Mr. Rau supported Mr. Kirsch's point of making load allocations more meaningful, specifically being much more prescriptive about BMPs needed to meet the load allocation. He suggested that too much flexibility undermines the ability to get work done, that being prescriptive is necessary to make progress in watersheds. Mr. Schempp asked whether he is concerned about pushback for telling people what to do. Mr. Rau acknowledged those sentiments but said that the people in the field tend to like to have a document with analysis to point to when conveying what needs to be done to meet standards.

A state participant noted that their TMDLs and watershed-based plans include analysis at a sub-watershed level to prioritize work to be done on the ground. An EPA participant referenced models as being an easy means of the CWA 303(d) Program better helping nonpoint source efforts. He noted that models are being developed with many components, and when the TMDL is actually developed, a significant amount of information gets lost. He offered an example of load allocations broken out by internal loading, watershed loading, etc. that are then combined in the TMDL, advocating that this detail be left in the TMDL so that it is readily available for implementers.

A state participant explained that they look at the HUC-14 level when doing assessments, and they identified waterbodies on the edge – recently impaired or trending better but not quite there. They then use that list to develop targeted requests for proposals for CWA 319 funding. She added that they have received several interesting projects. Another state participant explained that they recently had a meeting with county conservationists, and a challenge expressed regarding CWA 319 funding was the stipulation of compliance. Since NRCS funding does not come with this requirement and is much more extensive than CWA 319 funding, he continued, the farmers are less interested in the CWA 319 funding. The state participant added that a USDA staffer acknowledged that the agency has paid to have many practices installed that were not maintained. He said that the county conservationists are pushing to have all funding include a compliance stipulation, and he suggested that it be an objective of other levels too. Another state participant noted that farmers in his state tend to prefer CWA 319 funding because it requires one signature rather than forty.

Key Points Raised:

- From 2000 to 2016, 82 percent of the over 5,800 CWA 319-funded projects explicitly addressed nutrient impairments, and another 8 percent addressed pathogens, which often co-control nutrients. Since 2006, 153 waters have been restored for nutrient-related impairments through these efforts, covering roughly 80,000 acres of lakes, ponds, and reservoirs and roughly 1,500 miles of rivers and streams.
- From 2012 to 2017, 64 percent of CWA 319 funds spent on watershed-based-plan-guided projects (68 percent of such projects) went toward developing or implementing a TMDL.
- Roughly 80 percent of states will be updating their five-year Nonpoint Source Program plans in the next two years, presenting a prime opportunity for integration, including prioritizing waters, partnerships, and objectives.
- The working relationship of CWA 303(d) and CWA 319 Programs can benefit from:
    - Recognition that clean water is the objective of both programs;
    - Staff having responsibilities in both programs;
    - Both programs being in the same organizational unit;
    - The two programs being physically located near one another;
    - Identifying common interests, including program priorities;
    - The CWA 303(d) Program providing the CWA 319 Program with modeling support, but the latter doing what they can to minimize the burdens of modeling requests;
    - The CWA 303(d) Program doing a better job of source identification and quantification, including prioritizing which fields have the highest likelihood of delivering pollutants and the reductions necessary to meet water quality standards;
    - The CWA 303(d) Program making load allocations more meaningful, particularly being more specific about BMPs needed on a sub-basin scale to meet it;
    - Including in TMDLs details from models that otherwise might get merged or lost; and
    - Developing TMDL implementation plans that meet the nine elements of a watershed-based plan.

Session 5: Supporting Permitting

This session featured three presentations, each followed by a brief facilitated discussion. The intended outcomes of the session were:

- Participants will better understand the characteristics of TMDLs that can aid permitting program staff in drafting permits.
- Participants will be more familiar with innovations and needs in permitting and how TMDLs have supported them.

Tom Stiles, KS: Interfacing Nutrient TMDLs with NPDES or "After 6 Years of the Vision, How the Hell Did We Miss This?"

Mr. Stiles began the session by explaining that a significant amount of time, blood, sweat, and tears were spent with the CWA 303(d) Vision over the prior six years, but a captive audience has been given short shrift. With apologies to CWA 319 and monitoring friends, he continued,

establishing water quality standards, developing TMDLs, and permitting point sources are the three "gotta's" in the Clean Water Act. Mr. Stiles then presented a picture of a bridge to describe the function of Clean Water Act programs – environmental data and goals on one side, with CWA 303(d) listing and TMDL development being the bridge to implementation, which is on the other side. He added that, for all the good intentions, what makes it to the implementation side of the bridge is not always useful to the implementers. He said that permit writers often either ask him to interpret the TMDL or simply write a permit that does not match the TMDL.

Mr. Stiles displayed details from the Clean Water Act to demonstrate that there is very little connection between wasteload allocations and permitting in the statute, but then identified where in regulations the two programs are closely tied. He highlighted rule 122.44(d)(1)(vii), requiring that effluent limits are derived from and comply with water quality standards and are consistent with requirements and assumptions of the wasteload allocation under a TMDL.

Mr. Stiles then addressed nutrients specifically, saying that Kansas chose to promote reduction rather than pursue nutrient criteria in the early going. He noted that phosphorus was their priority, and while they did not know what the number was supposed to be, anecdotal evidence suggested that they had way too much. Mr. Stiles explained that they are focusing on 16 HUC-8s for TMDLs from 2012 to 2022. Regarding nitrogen, he continued, they adopted ammonia criteria in 2013 and moved toward denitrification. He added that nitrate impairments almost always are connected to a major point source that did not denitrify, which he labeled an easy fix.

Mr. Stiles noted that TMDLs took off and pushed investment in major point sources, but to make it effective, they set up mass limits in permits. He explained the decision to use mass limits rather than concentrations as being based on nutrients not being a toxics issue, what it affords for managing nutrients over the long term, the doors it opens to reuse and land application, and the reduced compliance issues vis-à-vis biological processes working against concentrations. Mr. Stiles then provided two examples of successfully putting mass limits in permits: Newton and El Dorado.

Mr. Stiles emphasized that criteria do not care whether a town has 100 or 100,000 people, so permit limits on a town must consider that its basic mission is just to survive. He referenced variances as wonderful things on paper, having resulted in site specific criteria, but that they are onerous and do not work seamlessly. He advocated for TMDLs to redistribute the responsibility of achieving water quality standards among the sources covered.

Mr. Stiles concluded his remarks with a few takeaway messages. He said that water quality standards are science, but science cannot solely dictate policy. He added that TMDLs are more than math; they must be easily understood by permit writers and create innovative options for permitting. Mr. Stiles emphasized that TMDLs must be permit-ready. He also suggested that NPDES needs to escape thinking in the steady state and embrace adaptive management. He explained the payoff for program staff as being able to show success, through improvement in the environment.

Allan Brockenbrough, VA: Commonwealth of Virginia's Chesapeake Bay Watershed General Permit

Mr. Brockenbrough started his presentation with background on the Chesapeake Bay. He explained that the bay's 64,000-square-mile watershed covers portions of five states and the District of Columbia, in 2 EPA regions, adding that it is home to over 17 million people and, while much agricultural land has been developed in recent years, agriculture also grew by over 100,000 acres between 2004 and 2014. Mr. Brockenbrough noted that the bay itself is 200 miles long, is an average of 21 feet deep, and has 11,684 miles of shoreline. He said that significant portions of the bay and its tidal tributaries are listed as impaired because of nitrogen, phosphorus, and sediment, and, while the first agreement between bay states was decades earlier, efforts did not get really serious until the 2010 TMDL.

Mr. Brockenbrough continued by providing a brief chronology of relevant events in Virginia, explaining that they have been working on nutrients issues since roughly 1985; developed Tributary Strategies that established loading goals in 2005; and passed legislation requiring a watershed general permit in 2005, with the VPDES Watershed General Permit becoming effective in 2007 and its effluent limits becoming effective in 2011. Mr. Brockenbrough described the driver of Virginia's approach as the legislature's directive to develop a watershed general permit to meet the nutrient cap load allocations cost-effectively and as soon as possible in keeping with the 2010 timeline and objectives of the Chesapeake 2000 agreement. He explained that dischargers got together with the Secretary of Natural Resources and the Chesapeake Bay Foundation to negotiate what a trading program would look like in Virginia, which resulted in legislation.

Mr. Brockenbrough noted that the general permit overlays individual NPDES permits and addresses only nutrients. He described the market as a conventional cap and trade structure, but he explained that aggregating permits is allowed, affording owners the ability to trade among their own facilities before trading with outside entities. Mr. Brockenbrough said that point-source-to-point-source trading is allowed for existing facilities to meet their initial load cap, but point-source-to-nonpoint-source trading is reserved for new and expanding facilities, adding that the latter is much trickier.

Mr. Brockenbrough then described the general permit. He noted that it covers over 150 facilities in all five watersheds and limits the annual mass of delivered loads for nitrogen and phosphorus based on Chesapeake Bay TMDL implementation, with more restrictive requirements as needed to meet local TMDLs or water quality standards in individual permits. He added that it also includes conditions for nutrient credit transactions, compliance schedules and plans, and monitoring and reporting requirements. Mr. Brockenbrough said that existing facilities have three ways to comply with the general permit: (1) meet the terms independently; (2) buy sufficient point source credits through the Nutrient Credit Exchange Association or through a private transaction; and (3) buy credits from the state-held Nutrient Offset Fund, if credits are not otherwise available on the market. He noted that new or expanding facilities offset new or expanded discharge by: (1) buying credits from one or more permitted facilities; (2) purchasing wasteload allocations from other sources; (3) buying credits from nonpoint source best management practices; (4) buying credits from the state-held Nutrient Offset Fund,

if credits are not otherwise available on the market; and/or (5) acquiring allocations through other means approved by the state on a case-by-case basis.

Mr. Brockenbrough then listed the benefits of Virginia's watershed-based permit. From the environmental perspective, he explained, it results in quicker nutrient reductions from point sources, manages additional loadings from growth through offsets of loads from new or expanding facilities, creates incentives for nonpoint sources to meet load allocations, and produces secondary benefits from BMPs. Mr. Brockenbrough identified as benefits to permittees the different tools that it provides for achieving compliance, its cost-effectiveness, and its easing of costs and resources associated with growth. For the Virginia Department of Environmental Quality, it streamlines the permitting process and increases stakeholder support.

Mr. Brockenbrough concluded by noting that a very small fraction of overall wasteload allocation is being traded, but 100 significant facilities trade as members of the Virginia Nutrient Credit Exchange Association, and nitrogen and phosphorus loadings are falling. He attributed this success to the ownership of the market that it gives permittees, the common schedule of compliance, the consistent requirements in the permit, and the establishment of the Nutrient Credit Exchange Association.

A state participant asked how the state puts a dollar value on phosphorus, to which Mr. Brockenbrough answered that the market does it. Mr. Brockenbrough explained that permittees wanted a market in part out of fear of all seeking construction projects at the same time. He said that the price for phosphorus was very low at the start, to encourage trading, but phosphorus now runs around eight or nine dollars per pound, adding that nitrogen is around three or four dollars per pound. Another state participant asked what percentage of wastewater treatment plants are trading. Mr. Brockenbrough said that there are not many new point sources, which must trade, and many of them have gotten five-year agreements. He noted that existing facilities that have had to expand have not traded much because they have upgraded their technology instead.

Kevin Kirsch, WI: TMDLs Supporting Permitting and Alternative Compliance Strategies

Mr. Kirsch began his presentation by setting the stage with an explanation of phosphorus management in Wisconsin. He detailed the state's phosphorus criteria: 100 μg/L for rivers; 75 μg/L for streams; 40 μg/L for not-stratified reservoirs; 30 μg/L for stratified reservoirs; 15-30 μg/L for inland lakes; 7 μg/L for Lake Michigan, and 5 μg/L for Lake Superior. At the same time as these criteria were developed, he continued, the state promulgated S. NR 217.13, which identifies how to calculate water-quality-based effluent limits for phosphorus. Mr. Kirsch added that the resulting calculations are expressed as a monthly average in permits, except for concentrations of less than or equal to 0.3 mg/L for which limitations may be expressed as six-month averages. As for compliance, he noted that the effluent limits must be met as soon as possible, with compliance schedules not to exceed seven years, although nine years is allowed if filtration or a similar treatment process is required. He said that most facilities comply within the first permit term.

Mr. Kirsch explained that, if the phosphorus limit based on an approved TMDL is less stringent than the calculated effluent limit, the department may include the TMDL-based limit in lieu of the calculated limit. If, he continued, the phosphorus limit based on an approved TMDL is more stringent than the calculated effluent limit, the department must include the TMDL-based limit in the WPDES permit. Mr. Kirsch noted that, given the low calculated limit, TMDLs can end up giving relief from existing regulations.

Mr. Kirsch then provided an example from the Wisconsin River Basin of how wasteload translates into wastewater allocations. He noted that the basin includes 21 counties, 85 cities and villages, 108 permitted wastewater facilities, 14 permitted MS4s, and 14 citizen groups. Mr. Kirsch listed compliance dates, which start in 2020, for facility permits. He explained that, once the wasteload allocation was determined, the state identified for all point sources what their allocations, permit limits, and compliance needs will be – whether they are able to meet the allocation, whether they are close to being able to meet it, or whether a chemical treatment or even tertiary treatment system is necessary. The state created a summary table for all of the point sources.

Mr. Kirsch continued by detailing the alternative compliance strategies of water quality trading and adaptive management, as well as briefly alluding to multi-discharger variances. He said that three state staffers work with regional coordinators on these matters. Mr. Kirsch clarified that water quality trading and adaptive management are voluntary compliance options and require nonpoint and/or other point source reductions. He described the process for each as having four steps: (1) deciding if the strategy is right for the point source and its partners; (2) working with partners to develop a plan; (3) submitting the plan to the state and a reissuance or modification of the permit to include the requirements for trading or adaptive management; and (4) complying with permit requirements and implementing the plan.

Mr. Kirsch explained the difference between adaptive management and water quality trading. The former can be used for total phosphorus and perhaps total suspended solids, whereas the latter can be used for all pollutants except toxins. He noted that permittees like adaptive management because there are no trade ratios, which water quality trading has, but they do not like that adaptive management is measured against standards at the end of 20 years and requires in-stream monitoring, neither of which is required in trading. Mr. Kirsch then detailed how the two strategies are connected to TMDLs, namely that load allocations expressed as edge-of-field numbers aid in the calculation of credits and help target fields for adaptive management; TMDL appendices provide information on reductions needed to meet local versus downstream water quality; and reductions commonly are driven by downstream water quality, identifying flexibility in where trading partners are located.

Mr. Kirsch concluded by noting the extent to which the different alternative compliance strategies have been used: 18 water quality trading plans had been approved or were in the process of being approved, and 10 adaptive management plans had been approved or were under review. In addition, 43 multi-discharger variance applications had been approved, and 3 more were under review.

An EPA participant sought clarification as to how the adaptive management strategy meets permit limits, to which Mr. Kirsch responded that the point sources are placed on a 20-year compliance schedule with 5-year intervals, and if they do not comply with the schedule, they can be kicked out. A state participant asked whether Wisconsin has extra staff to handle the administrative challenges of this structure. Mr. Kirsch said that the three coordinators gained additional workload, and they have five weekly calls amongst themselves as well as biweekly calls with regional coordinators. He added that they spend a quarter to a third of their time on it. Another state participant asked what controls are in place for it. Mr. Kirsch explained that a certain percentage of funding can be spent on administering the program and another set percentage can be spent on implementation. He added that they are in their first round, and some of the support for implementation is as little as $100, with which little can be done, so his colleague has been working on doing the most with it, including allowing the money to be spent anywhere in the watershed.

An EPA participant noted that they have to go through a special process to be able to give annual limits, a process that does not apply to local limits, leading her to ask whether Wisconsin goes through the same process for its limits on phosphorus. Mr. Kirsch clarified that Wisconsin has a monthly limit and a six-month limit.

Key Points Raised:

- TMDLs should be permit-ready.
- TMDLs are more than math; they must be easily understood by permit writers and create innovative options for permitting.
- Water quality standards are science, but science cannot solely dictate policy. Whether a town has 100 or 100,000 people matters in practice. TMDLs may need to redistribute the responsibility of achieving water quality standards among the sources covered.
- In Kansas, nutrient TMDLs pushed investment in major point sources, but to make them effective in practice, the state used mass limits rather than concentrations in permits, the reasons being that nutrients are not toxics and mass limits allow better nutrient management over the long term, allow for reuse and land application, and reduce compliance issues.
- Virginia developed a watershed general permit for nutrients that overlays individual NPDES permits. Dischargers worked with the state to develop a trading program under the general permit, and it has resulted in quicker nutrient reductions from point sources, cost-effective management of additional loadings from growth, and incentives for nonpoint sources to meet load allocations, all with streamlined permitting and increased stakeholder support. Its success stems from the market ownership that it gives permittees, the common schedule of compliance, the consistent requirements in the permit, and the establishment of the Nutrient Credit Exchange Association.
- In Wisconsin, the alternative compliance strategies of water quality trading and adaptive management are connected to TMDLs by the fact that load allocations expressed as edge-of-field numbers aid in the calculation of credits and help target fields for adaptive management; TMDL appendices provide information on reductions needed to meet local versus downstream water quality; and reductions commonly are driven by downstream water quality, identifying flexibility in where trading partners are located.
- In the Wisconsin River Basin, once the wasteload allocation of the TMDL was determined, the state identified for all point sources what their allocations, permit limits, and compliance needs will be – whether they are able to meet the allocation, whether they are

close to being able to meet it, or whether a chemical treatment or even tertiary treatment system is necessary.

Session 6a: Small Group Training I

This breakout session consisted of five breakout groups, each focusing on a different topic. Participants were assigned to a group based on their respective preferences, expressed prior to the training workshop. Formal notes were not taken for the breakouts, but participants were asked to identify up to three key takeaways, opportunities, and/or solutions in many of the breakouts. Curated lists of those participant responses appear below.

- *ATTAINS User Interface I: Data Entry and Batch Upload [1st half]*
    - Can do batch upload or manual entry
    - Batch uploading will be the key for us to get our information into ATTAINS
    - Batch upload is a powerful tool to modify many assessment units
    - Make sure you're in the correct screen to upload the batch spreadsheets
    - Templates are located at EPA ATTAINS website
    - The templates for batch upload are very user-friendly, although it might be nice if the exported files contained a date (e.g., MonStat_20180531) so that you can better track / manage files
    - Can enter "All in One" or just "Water Types" or "Monitoring Stations" (options are in templates).
    - Can rename the .csv if I go to file, save instead of use the export button
    - ATTAINS only takes .csv files
    - Check Excel template for fixes
    - Locations tab was giving upload errors
    - Found out system is as picky as WQX
    - The demos & exercises were helpful
    - Easy to follow up with some help
    - Is there a video to share with others in the future?
    - Need to practice

- *Water Quality Portal Data Discovery and Data Analysis Tools*
    - Shiny deployment via web app may reach users that are not comfortable in R, but big data processing can be challenging via remote servers
    - Water Quality Portal provides a way to download and filter data in a simple user interface
    - I appreciate the better user interface for the Water Quality Portal than STORET's, especially the filtering option
    - Water Quality portal should be a good alternative to AWQMs system adopted by Oregon DEQ for accessing ODEQ data
    - Seems like data discovery tool will be useful for both state agencies and the public in accessing data
    - A QA/QC function exists
    - I like that we can get access to R code

- New data tables
- Potential for interstate and EPA collaboration on analysis tools
- Data analysis tools might be very useful eventually
- Better way to access stored data is available
- Data analysis tool does not work with continuous data
- Intrigued by EPA data portal for continuous data
- I would like ability to get maps, chart, or tables from the data, for use in 305(b) report, presentation, etc.
- Possibly add tribal boundaries to location selection
- Look into how to assist tribes in conducting data analysis (and eventually some graphics options)
- Need to add the ability to select parameters in the discovery tools; cannot rely on groups
- Need to use methods for statistically estimating values below reporting limit and/or detection limits
- I would like to see QA/QC documents for data that I use (that is not my own)
- Perhaps each data point could have a link to QAPP/SOP/QA/QC documents
- Please contact gold systems regarding data analysis tools for their AWQMS database

- *Alternatives*
  - Stakeholder involvement is key: the more stakeholders feel valued and heard, the more they will trust the state and want to stay involved
  - Education and outreach is key
  - A plan explaining how water quality standards will be attained is key
  - Developing and presenting the alternative plan can help catalyze awareness and increase the likelihood of success
  - Alternatives are a good tool for certain situations, and the states should evaluate which is the best tool for waterbody restoration
  - Alternative plans can be in the form of 5-alt plans, alternative restoration plans, and 4b plans/projects, in addition to watershed-based plans (319 plans)
  - Many states are using watershed-based plans as alternatives
  - Heather Husband's idea to modify watershed planning so all are going forward = alternative worthy
  - Developing 5-alt plans can facilitate growing intra-agency communications and collaborations by joining CWA 303(d) and CWA 319 efforts, can result in a much more comprehensive plan than 4a-TMDL
  - It seems there is a lot of duplication with wastershed-based plans, which is hard for regions strapped for staff resources
  - 5-alt plans have "considerations" and not requirements; but if you are writing a watershed-based plan, it still needs the nine elements to get CWA 319 funding
  - Alternatives can be useful for addressing point sources
  - Alternative plans should be designed to obtain water quality standards, not just improve water quality

- Alternatives are already things we are doing but not sure we need to focus on getting more in line unless they fall under the Vision priorities [Outside of the WQ-27 = NO POINT]
- The focus on alternatives should be on how to make/compile plans that will lead to water quality restoration, NOT how to make plans that EPA will accept/count for measures
- EPA is more focused on improving water quality than counting Vision beans
- EPA accepts plans for recognition, but does not approve them; states can designate 5-alt waters that are still considered impaired; EPA can approve the list but does not have the authority to put the water on/off 5-alt
- 5-alt could be a path to plans that are not effective; can these 5-alt plans really be vetted?
- Some regions are more comfortable with alternatives than others; these regions are looking at the big picture of restoring water quality to meet standards
- EPA regions need to work harder to get on the same page on the value and "ok-ness" of doing 5-alt plans that make sense
- We still have misconceptions and could use more time for questions and discussion
- Need to clarify that alt plans do not mean that a state is not doing TMDLs anymore
- Please provide a fact sheet to states explaining expectations
- Please provide a link to approved alternatives, or an EPA checklist for 5-alt plans
- Ultimately, 5-alt plans are not enforceable like a TMDL is – no regulatory hammer for 5-alt plan
- Trust in the states is key
- Unintended consequences – litigation risk?
- TMDL alternatives need to be revisited and scheduled for TMDL developments if improvement is not found
- An alternative approach includes a timeline with milestones

- *The IR Transition*
  - It is very important to use the assessment unit comment field, to document what is there and to record decision-making for future staff and for monitoring efforts
  - Use the state-specific test ATTAINS to practice batch uploading and verify that batch uploads are error-free before final submission
  - Expect errors, hurdles, and roadblocks; every state will have its own issues
  - Prepare to commit some resources to the transition
  - Communicate often with EPA staff during the transition
  - Share data with EPA regional staff early, if possible
  - Merging AUs is something that requires a lot of pre-communication with regional staff and Headquarters data staff
  - States should use ATTAINS as an opportunity to get information needed from other programs/bureaus (that may have been reluctant to share in the past)
  - ATTAINS provides an opportunity to correct past mistakes (in ADB, etc.), which is ideal because that knowledge may become inaccessible as folks retire
  - Different states have used ATTAINS successfully in different ways (e.g., batch mode vs. node)

    - Current odd-year assessments will be in the ATTAINS system, although previous years are not featured

- *Citizen Science*
    - Citizen science can play a big role in the restoration and/or protection of local water quality
    - Start small
    - It is essential to train and audit volunteers to ensure good data collection practices
    - Safety needs to be a key consideration
    - Keep information simple with pictures and videos
    - Use of apps, such as the Bloomwatch app for monitoring algal blooms, has the potential to increase the utility of data provided by citizen scientists
    - Trainings for citizen science participants are more effective when using the sites the citizens plan to sample
    - Using different tiers (with different levels of oversight and/or monitoring categories) based on volunteers' level of training can work well
    - Flexible approaches are needed to accommodate volunteers' capacity
    - There is variation between what is stated and what actually happens in terms of scope and formality of volunteer monitoring programs
    - Citizen monitoring can assist a wide range of CWA program tasks (e.g., TMDL development, CWA 303(d) listing assessment, model calibration and validation, nonpoint effectiveness monitoring, TMDL implementation)
    - The uses of citizen monitoring data are different depending on the certainty of the quality of the data (e.g., it might be used like any other state-collected data if analyzed by the state lab or a NELAC – certified lab)
    - Grants for lab work removes a key barrier
    - A loaning library for meters helps
    - EPA R1 has a generic QAPP for citizen science
    - It is important to recognize and thank volunteers; small gestures go a long way
    - Incentives for volunteers are important, but some volunteers are genuinely vested in stewardship
    - Laws and regulations regarding the use of citizen scientists vary greatly and affect the ability to use volunteer monitors

Session 6b: Small Group Training II

The second breakout session also consisted of five breakout groups, each focusing on a different topic. Again, participants were assigned to a group based on their respective preferences, expressed prior to the training workshop. Formal notes were not taken for the breakouts, but participants were asked to identify up to three key takeaways, opportunities, and/or solutions in many of the breakouts. Curated lists of those participant responses appear below.

- *ATTAINS User Interface I: Data Entry and Batch Upload [2nd half]*
    - Fill in all required information and use correct formatting to avoid errors
    - The system is built to show you if you have made errors

- Remember to scroll down and click all the buttons to find all the requirements
- Be sure to include all required parameters and to match them with the proper use
- If the use is "not supporting," a parameter/cause must be included
- If the parameter/use is Category 5, the priority must be specified (or else there will be an error message on the summary page)
- If there is a lot of data, batch uploading is likely to be more effective
- When batch uploading, check the template file for assessments
- In the Assessment_Batch Upload Template – the dropdown choices for the "param_attainment_code" column are not correct
- The dropdown menu for "PARAM_use_name" was not alphabetically organized, which makes it hard to go through to select
- The "CWA 303(d) Priority Ranking" and "Cycle scheduled for TMDL" should be required fields

- *Managing Large Datasets with R*
  - R is powerful and broadly applicable
  - R is a community-centric and evolving, improving, and free tool
  - Even though R started as a statistical program, there are many other uses, but you have to know how to speak the language
  - It can be used for data management, assessment, and reporting
  - R greatly increases efficiency if automation is not already in your work plan
  - Using R to merge large data sets cuts down formatting time
  - Using R to visualize data within downloads is helpful
  - It was easier than expected to start using it
  - Training opportunities from the regions as well as 'packages' for working within R would be helpful
  - EPA should sponsor an R user group (listserv) and training and data share tool location for R so states can work together and move forward
  - It is useful to have more than one person trained in R in-house
  - Tribes will not have a programmer on staff, so without EPA assistance they will be left behind
  - R Markdown is a library that creates HTMLs

- *Monitoring*
  - Monitoring methods are not one-size-fits-all
  - The monitoring design and scale must be appropriate for the questions being asked
  - The need to answer specific questions with monitoring requires specific knowledge of the area, landscape, etc., and that includes the ability to work with and communicate with local partners and stakeholders
  - Know what you expect to get from the monitoring
  - Monitoring can make it possible to answer questions at multiple scales
  - Probabilistic monitoring is useful for the upper management
  - Targeted monitoring is useful for stakeholders
  - It is important to consider whether to use probabilistic or targeted monitoring; it would be helpful to have documents comparing uses and the benefit and difficulties of each

- Monitoring has many uses beyond assessment, but there is always a push to assess if there is data
- EPA needs to modernize older guidance and approaches to provide more flexibility to states and EPA, and to make the documents less static
- Consider regional monitoring networks with other monitoring entities to optimize resources (creative data criteria are necessary to do this)
- CWA 303(d) and nonpoint source monitoring objectives should be more closely coordinated during planning
- Data sharing with NRCS should be improved
- Re-evaluate NWQI; since many states do not see cooperative data sharing from NRCS, selections of sites are often not done in coordination and mutual agreement with states, making it difficult to plan monitoring for selected sites
- There should be a safe space in which to compile failures, as they can be more informative than successes
- If possible, there should be a compiled list of all other state, regional, and territorial monitoring strategies for review and to compare and use ideas

- *Modeling*
  - It is very important to choose the right model
  - Choosing a model involves careful consideration of available data and desired parameters
  - A model selection matrix or updated website with information about models would be very helpful in choosing an appropriate model for a specific application
  - It would be helpful to have a document or tool that shows data inputs for models
  - A good overview of steady-state models versus mechanistic models would be useful
  - It would be helpful to have a repository of examples of models being used for TMDL development, along with their outcomes, pros and cons, etc.

Session 6c: Small Group Training III

The third breakout session consisted of six breakout groups, each focusing on a different topic. Again, participants were assigned to a group based on their respective preferences, expressed prior to the training workshop. Formal notes were not taken for the breakouts, but participants were asked to identify up to three key takeaways, opportunities, and/or solutions in many of the breakouts. Curated lists of those participant responses appear below.

- *ATTAINS for Managers*
  - The 2018 Integrated Reports are being submitted electronically through ATTAINS
  - ATTAINS provides an opportunity to change the approach to Integrated Report submittals
  - It will take some time to get used the new system
  - ATTAINS shows multiple parameters
  - ATTAINS focuses more on the data and less on the hardcopy report

- Spending time to get the initial submission accurate will make subsequent submissions easier
- ATTAINS data will be available in the *How's My Waterway?* app
- EPA will be reviewing submissions electronically, and the submissions will include all administrative records/documentation
- Exchange passwords need to migrate, which will require work with regional staff

- *Open Forum: Bacteria*
  - States are all over the place in terms of where they are and where they are trying to go regarding bacteria
  - There is no good, straightforward, method for monitoring or regulating bacteria in the environment; there are too many variables at play
  - There are a number of opportunities for webinars on topics such as stormwater flow, background conditions, translating a standard to revise a TMDL, and data sufficiency and geometric mean calculators, as well as monitoring strategies and predictive modeling
  - For bacteria as well as other topics (such as modeling and nutrient assessment methods), there seems to be a need for more effective information exchange and reporting of case studies so that states and regions can easily find examples of issues and solutions
  - It would be helpful to see what states are using as fecal-to-E. coli translators
  - More information on wet weather standards would be useful
  - More discussion and information on bacteria source tracking is needed
  - It would be helpful to have criteria that account for animal sources, since they carry a lower risk compared to human sources
  - A possible approach is to use geometric means during the swim season, and to put that in the water quality standards
  - Define what is swimmable
  - If a state already has EPA-approved secondary contact recreation criteria, it might be a good idea not to change them so that they can stay in effect
  - It is important to think about predictive modeling for meeting monitoring needs
  - Research needs to be done on bacteria persistence (in various weather conditions and habitat) and background soil levels
  - Use high flow exclusions as appropriate

- *Stressor Identification*
  - States have a variety of ways of identifying stressors
  - The process all depends on clear water quality standards, assessment methodology, and data collection
  - A clearinghouse or other means of sharing state stressor identification methods and tools, including best practices, communication strategies, R codes, presentations, etc., would be useful
  - A webinar series on stressor identification also would be really useful
  - States can use epidemiological methods to identify stressors
  - Each state has its own unique challenges to automating stressor identification

- *Protection*
    - There are a variety of protection practices and activities across the states
    - There appear to be four "species" of protection: high quality resource protection; programmatic protection (a TMDL or an "alternative" covers unimpaired or unassessed waters); protection of threatened waters; and protection of restored waters (keeping TMDL to maintain water quality)
    - Protection TMDLs can be created just through the process of developing watershed TMDLs
    - A TMDL serves a protection role once a waterbody is meeting water quality standards, and the TMDL is maintained to ensure continued compliance with those standards, but are additional procedures or documentation needed?
    - Clarifying terminology is needed
    - Clarity is needed as to how protection plans fit into the Integrated Report
    - Kansas places protective TMDLs in a Category 2a
    - EPA should clarify how protection plans will be tracked in ATTAINS
    - Continued discussion is needed as to what qualifies as a protection plan
    - EPA regions should provide guidance as to acceptance of protection plans
    - There is an opportunity to provide clarity on the use of CWA 319 funds for protection activities
    - Protection FAQs will be very helpful to states because they can emphasize that protection is a component of restoration; many states are too busy doing TMDLs and restoration to do a protection plan, but a protection plan is a tool for downstream restoration
    - Be careful with the messaging to TMDL staff, because other staff are working in these areas and should be consulted on actions; valued waters might be identified already
    - It can be difficult to force protection plans; they work better as a local idea

- *CWA 303(d) TAS*
    - Tribes are severely underfunded
    - Tribes face a number of hurdles regarding CWA 303(d) implementation; EPA can help them brainstorm solutions
    - Much more discussion on this topic is needed

Session 7: Regional Meetings and Additional Trainings

This breakout session consisted of six regional meetings, one for each of EPA Regions III, IV, V, VI, IX, and X, each with the state, tribal, territorial, and EPA participants from that region. Participants from EPA Regions I, II, VII, and VIII joined either a training on monitoring and modeling or a comprehensive, demo-based training on ATTAINS. Whether a region convened during this period was determined by popular vote of the state, tribal, territorial, and EPA participants from each region in advance of the training workshop. Participants from those regions not convening during this period were assigned to a training based on their respective preferences, expressed prior to the workshop. The intended outcomes of the seventh session included:

- Participants will be more familiar with the needs, challenges, and views of others in their respective regions.
- Participants will have resolved, or at least advanced conversation on, issues important to the states, tribes, and territories of the region.
- Participants will better understand issues, procedures, and tools that are of particular importance to the successful implementation of their respective programs, and to achieving their goals for 2022.

Prior to the training workshop, ELI collected discussion topic preferences from each of the state, tribal, and territorial participants, as part of the registration process. ELI created distinct lists of identified topics for each of the six regions that would be convening and used those lists as the basis of discussion with EPA regional participants in the development of an agenda for each convening. ELI staff also worked with the presenters for the two trainings to ensure that they were organized and sufficiently prepared.

Session 8: Communication

This session featured four presentations, followed by a brief facilitated discussion. The intended outcomes of the session were:

- Participants will be more familiar with the diverse ways that other states, tribes, and territories have sought to improve communication with stakeholders and the public.
- Participants will better understand the outcomes of different communication methods in different contexts.

Stephanie Santell of EPA Headquarters opened the session by stating that communication and engagement with local and national stakeholders is key to the success of the CWA 303(d) Program. As such, engagement is one of the six goals of the program's long-term Vision. Ms. Santell explained that communicating problems and progress to the public, while vital, is insufficient on its own; it is also important to communicate how the work of the program relates to the public and how they can participate. She referenced the many tools developed at the national and state levels to help with this effort in a digital age, including EPA's *How's My Waterway?* app, but then asked how to ensure that they are being used correctly, by at least the intended audience, and with the intended results.

Ms. Santell shared lessons from a stakeholder meeting in March regarding the *How's My Waterway?* app and communication generally, saying that it reiterated the importance of providing context, being useful in practice, resonating with a wide audience, and empowering action and education. Ms. Santell highlighted the need to reach out to people who do not already have a voice on these issues, since engaging more people helps add more expertise and resources to the program.

Ms. Santell then explained that the session's presentations would focus on examples of different types of communication, from two-way communication, to making documents more engaging, to effective in-person communication. She encouraged the participants to think about what works for

them and be ready to share that during the discussion portions of the session. Ms. Santell then introduced the presenters.

Jade Dickens, AZ: Citizen Science and Technology: There's An App For That!

Ms. Dickens began her presentation by explaining that the coordinator for the Arizona Water Watch Citizen Science Program came from the Monitoring Program, and her first step in that role was to draft a visual timeline of tasks. The app was half way down the timeline and was viewed as something interesting to try. In that one year of citizen monitoring, 2017, continued Ms. Dickens, over 20 groups collected over 6,000 records. With significant variation in water quality monitoring strategies and techniques, for DEQ to get credible data, the volunteers needed training, she explained. The agency also loans out equipment and develops study designs.

Ms. Dickens explained that the volunteer opportunities in Arizona have several different levels of complexity. The app, she added, is for "weekend warriors" – people out recreating in Arizona who want to spend a few minutes reporting data but not do hardcore sampling. Ms. Dickens noted that the Rubbish Rangers photograph the trash they pick up, which allows for quantification of the trash being removed from Arizona streams. She said that the agency also crowdsources pictures to characterize when there is flow.

Ms. Dickens then provided details on the app itself, noting that it was released in November of 2017 and requires roughly three minutes to create a record, between answering a few yes/no questions and adding a photo and comments. She said that it uses the Survey 123 platform and was built in-house. Ms. Dickens showed a picture of the rack card that the Agency created for the app, which provides basic details on what the app is and how to get it. She explained that the rack card is available at state parks, and they are trying to get them into REI, Bass Pro Shops, Cabela's, etc. In addition to the rack card, Ms. Dickens said that the agency is getting the word out about the app through a webpage, a video, social media, the news, and written articles.

Ms. Dickens highlighted that the app has a legal disclaimer at the start that advises users not to trespass. She explained that the app geolocates where an observation is collected, which is a little difficult if there is no cellular service. In some instances, people have had to manually enter the location, but she said that they have not had issues with people incorrectly reporting locations. Ms. Dickens walked through the questions on the app; for some of the questions, if the user answers yes, the app asks for further details. The HABs coordinator is notified if there is an algal bloom reported. In addition, she added, if the user desires to file a formal complaint, there is a way to submit that to the agency.

Ms. Dickens then detailed the internal review of these submissions, noting that they check all of the data. Once the submission is approved, she added, the observations are available in the public view. In the few months since the app's release, explained Ms. Dickens, 60 records have been submitted by 24 participants, which indicates that people are using it repeatedly. She added that people prefer to go out in mornings, so there are more records from that time of the

day, and there is a bias toward taking a picture of free flowing water, despite the fact that the agency also would like pictures of dry conditions.

Ms. Dickens concluded by saying that they are happy to share their app and coding with anyone who is interested.

The discussion following Ms. Dickens' presentation began with a question from an EPA participant. After noting that they have created a similar app for algae, using contractors at a cost of $50,000, he asked much time the Arizona Department of Environmental Quality spent on the app's development in-house. Ms. Dickens said that she would need to check with their IT staff, that significant time was spent conceptualizing the app in meetings; however, it only took 40 hours to build. She added that they then spent time field testing it. Mr. Schempp then asked if the EPA participant would elaborate on the details of the referenced app for the benefit of the other participants. He explained that it is very similar to what was developed in Arizona, a two-way communication, citizen science-based app, where people submit photos. He noted that it targets algal blooms, not HABs, and was developed through a grant-funded partnership with one of their states. The EPA participant added that there has been significant advertising regarding the app, and it had been very well received and supported by the tourism industry. He said that this also is their first year, and he offered to report back next year.

Another participant referenced Bloom Watch, which also is a two-way communication app in which anyone with a smartphone can photograph a potential HAB. He added that the user can send a notification to their state contact, and while it is not an official report, if the problem appears notable, the state will go look at it. The participant asked Ms. Dickens whether they included a warning about GPS location, specifically the problem of coordinates attaching to a picture when the user is back in cellular range, rather than where the picture was taken. Ms. Dickens replied that they had only included mention of that potential problem in news articles, but she said that it had not been an issue to date.

Another EPA participant asked for further details regarding the quality control process after data are received, including how long it takes to process a record. Ms. Dickens replied that the agency updates the records quarterly, and that they would do it more frequently if they had more staff. She added that the quarterly reviews do not take that long, half a day at most, to ensure that the pictures are consistent with the location. A state participant asked whether there has been any discussion about expectations of the public to come pick up the trash that is reported through the app. Ms. Dickens said that she expects to hear comments like that, but they are trying to empower citizens to pick up the trash themselves through Rubbish Ranger. Another state participant asked whether the trash information is being fed to the Rubbish Rangers, to which Ms. Dickens replied that part of the task is updating the maps, and part of the task is getting the volunteers to go where they are needed.

A state participant asked whether users receive an email confirmation of the submitted record. Ms. Dickens responded that they do, and once the records are posted, they can see their pictures online. An EPA participant asked whether the Arizona Department of Environmental Quality plans to use the records to determine impairments. Ms. Dickens replied that they do not, but that the records

might help sharpen their focus, such as directing some sampling or highlighting an area for CWA 319-funded work.

A state participant noted that North Carolina has developed several apps, including one called Trash Tracker. In it, he explained, the public information is seen instantly on the map. He added that the app has been out for over a year, although not advertised widely. The state participant said that he had trained many college classes and, even with them, nothing mischievous had been posted. He distinguished the "pro" version, which requires a login, from the citizen science version, which does not. Submissions made when logged in are tagged with the submitter's name, he added. Ms. Dickens noted that names and email addresses accompany their submissions, allowing the state staff to reach out to the user if something is inappropriate. She also mentioned that, if they do not know the user, they will reach out with a thank-you note to encourage him or her to continue participating. The state participant further elaborated on the "pro" version of the app, noting that those users can contribute Integrated Report assessments that will be used for assessments other than Category 5. He also said that the state will be releasing the full box of tools for public access in July.

Mr. Schempp concluded the discussion on two-way communication by referencing the stakeholder meeting from March, where participants highlighted the importance of the engaged public feeling as though they are contributing information. He added that even low-grade data, such as photographs, can accomplish this end, making the public part of the process.

Dustin Shull, PA: Story Map: Looking Below the Surface

Mr. Shull began the first of his two presentations by explaining that Pennsylvania uses macroinvertebrate data rather heavily, adding that they receive many requests for the data. Mr. Shull noted that one of the original goals of the story map project was to create a simpler way to get the data to those who want it, and thus reduce the amount of time spent fulfilling data requests. He acknowledged that what resulted from the effort was much more than that.

Mr. Shull described his agency's website as containing data and tools, including geospatial data and GIS software, allowing the public efficient access to them through an open data portal. He emphasized that this gets to the heart of the conversation about communication. Mr. Shull briefly described story maps from ESRI. For the one he would be presenting, he continued, he worked with staff in the programming, geospatial, communications, education, and policy teams. Mr. Shull said that the goal of the project was to produce an educational communication tool on why the state does what it does, adding that it was designed for users with only a secondary or even just elementary education.

Mr. Shull read the title, "Looking Below the Surface," and explained that the story map starts with a very basic explanation of what macroinvertebrates are. He emphasized the need to connect with the audience early – okay, it is flipping rocks for a living. Mr. Shull continued, demonstrating the way in which the story map imparts the significance of macroinvertebrates, via the food chain and recreational and fishing uses. The story map then covers how the data about macroinvertebrates are collected and used, and why they matter from a legal standpoint. The three collection methods are simply described: the Freestone Method (as applied in riffle

run habitat); the limestone method; and the multi-habitat collection method. Each bug collection method has thresholds, he continued, which does not mean much to the public, so they broke it down.

Mr. Shull suggested that good visuals are key to success, adding that fully interactive maps provide more information the closer the zoom. He demonstrated that clicking on a stream reach reveals its name; it also reveals which streams are multi-habitat, limestone, or freestone. He explained that they kept the information provided simple, so as not to inundate the public. Mr. Shull noted that a user can pan around and see patterns in the state. He said they liked the way that this presented itself, so he took it one step further and did a spline with data, resulting in a piedmont map of the state, showing where there is good or bad biology. Mr. Shull clarified that the data is targeted, not probabilistic, but they could create a pie chart of the percentage of streams in good, fair, and poor condition for macroinvertebrate biology in the state, which was the first time that was possible.

Mr. Shull also demonstrated an overlay of biological data with land use data, which revealed why some of the patterns in biological data are the way they are. He added that the visual facilitates conversation about the problems and causes. Mr. Shull identified the power of a story map as being the ability to receive a lot of information in a short amount of time, but if the user desires more detail, it is easily accessed. In essence, he continued, a story map is an accordion – it can be condensed or expanded depending on what the user wants.

Mr. Shull lamented that all of the work that went into the "Looking Below the Surface" story map still did not achieve his goal of sharing data. He explained that story maps tell a story using maps and other graphics, but the way Esri does it through viewers, accessing the underlying data is difficult, requiring use of another viewer or platform. Mr. Shull explained that this led them to develop a means by which a user could simply pull the data. For example, when looking at a map, a user could download a file that contains the data behind the map. Mr. Shull said that a user can get the station information, biology scores, metrics, and land use calculations of the upstream basin for all 7,500 stations in the state, a tremendous amount of data. He added that their product allows a search by attribute, not just by shape, and it links tables together, such as taxa data matched up to other fields. In addition to the obvious regulatory purposes, he noted that people could use these data to find out scientific names for fishing and see abundances of the species they are encountering. Mr. Shull reiterated that the product has a lot of power and utility.

Dustin Shull, PA: Draft 2018 Pennsylvania Integrated Water Quality Monitoring and Assessment Report

Shifting to a description of Pennsylvania's draft Integrated Report, Mr. Shull noted that they wanted to take the story map product one step further in developing the Integrated Report, and in the process, revamp how they envision the document. He explained that the report used to be 5,500 printed pages, plus the 83-page narrative. Mr. Shull said they were tired of working like that because no one would read it. He added that they wanted to design something the public would actually use.

Mr. Shull acknowledged that there are advantages and disadvantages to this approach. He referenced the EPA guidance over the years on how to create an Integrated Report, noting that, while they are trying to follow that guidance, they are also turning some things on their heads. Mr. Shull said that they want the public to get an educational experience from it. There is a welcome screen, an explanation of the purpose of the Clean Water Act, and an atlas of waters, all of which are interactive. Mr. Shull demonstrated the ability to click on links to get information at certain resolutions; things expand and contract so as not to divert users from the main story. For example, he showed the overview of protected uses in the state and what the categories and statuses are as of 2016, effectively 5,500 pages in one page and viewable in many different formats.

Mr. Shull stressed the importance of pictures and stunning visuals. He also highlighted the need to click and print things easily, for legal reasons among others. Hovering over the charts reveals the statistics, but even these are printable. He suggested also including an interface to other reports. Mr. Shull said that all data collection protocols and assessment methodologies are plainly available. He noted that EPA sometimes requests information, and thus the states need to include it. What is Category 5? A user can go to the viewer, pop out a viewer, and get all the information they need about it. He added that the prioritization strategy comes right up so that it can be printed or emailed as well.

Mr. Shull then referenced the section listing all the state programs that protect or control water quality, followed by a section on trends. He noted that there are many places that a user can go to get the same information, to provide different ways of accessing that information. Mr. Shull said that they tried to change the way that people access and interact with the information, to display things in a better way. He demonstrated the use of an interactive map to compare loads across stations and how they are trying to capture restoration efforts, including wetland replacement projects and permittees.

Mr. Shull continued by noting that, for the first time, all of the state's delistings since 1998 are in a single database and conveniently presented to the public. He added that there is a comment window for public feedback, staff contact information, and an opportunity to sign up for the agency's newsletter. Mr. Shull emphasized that they are trying to make this a one-stop shop.

Following Mr. Shull's presentations, a state participant sought clarification that the app that Pennsylvania is using for its Integrated Report is a web report. Mr. Shull explained that it is code, developed in Microsoft Visual Studio. He said that the code is free and can be downloaded at GitHub. He said that when the code is run, it basically produces the website, and once the code has been modified to the user's preferences, it can be put in a web server and released to the world. The state participant then asked whether Pennsylvania developed the code in-house. Mr. Shull said that many of them on staff know R now, but they learned how to do it, and they did the same thing here. He noted that the learning curve can be fairly gradual because the person can take a piece of already-created code, click the "run" button, and see what it does. Another state participant asked how long the process takes. Mr. Shull responded that it took him four hours to learn how to do this, adding that it takes longer to learn how to code, but one can copy and paste and make minimal changes.

A state participant said that she must show her Integrated Report to a panel of 14 people who are not that technologically savvy, leading her to ask whether review by a commission is required in Pennsylvania and, if so, whether the report is delivered in a more traditional format for that purpose. Mr. Shull responded that they do not have review by a commission, but they do have legal review, and their lawyers expressed concern over this approach for that exact same reason. This, he continued, is why they wrote into code the ability to print everything. Another participant from Pennsylvania clarified that they are required to present the report to a water resources advisory committee, and that they also presented it to an agriculture advisory board for feedback because of the content of the report, adding that everyone bought into the approach.

An EPA participant asked whether Pennsylvania intends to approach the report as a living document or just update the information at the next cycle. She also asked where they keep the archive in case anyone wants to look at a previous cycle. Mr. Shull explained that, once the report is final, it becomes a record and stays as is, adding that they can just pick up the code and update the information to have the next year's report, without creating it all over again. Another EPA participant asked how all of this was accomplished, whether it was just the right staff with the right abilities in the right place. Mr. Shull responded in the affirmative, but noted that the right people can actually be one person. He recommended not having that level of reliance on a single person, but that such may be the situation. Mr. Shull said that he does bugs, rivers, and streams as well as GIS and some coding and statistics. He noted that it is not a leap to build this sort of a product, but emphasized some of the collaborative elements required: legal, policy, and communications, for example.

An EPA participant complimented the work and asked whether the restoration portions of the report goes deeper than the "bite" that Mr. Shull provided in his presentation, especially to the point where the public can access the restoration strategies. Mr. Shull noted that the first step was to get the data to the public, but that they plan to, somewhere down the road, sit story maps on restoration approaches in the Integrated Report, just as it presently contains the macroinvertebrates story map.

Amy Steimke and Graham Freeman, ID: Communicating with the Public via BAGs and WAGs

Ms. Steimke began the presentation by discussing in-person communications and what it takes to put together an advisory group. She explained that Idaho has both Basin Advisory Groups (BAGs) and Watershed Advisory Groups (WAGs). Ms. Steimke noted that there is a BAG for each of the state's six major river basins, each roughly aligning with regional office boundaries. WAGs, she continued, are created on a HUC-8 watershed scale, and while not all watersheds are active, consultation with a WAG is required for the TMDL process, unless representatives cannot be identified.

Ms. Steimke noted that BAGs have more of a programmatic focus, recommending priorities for stream monitoring, recommending revisions to beneficial uses and water quality standards, assigning water body priorities for TMDLs, and reviewing TMDLs, among other responsibilities. She said that WAGs focus more on implementation and public involvement, such as advising the state on TMDL implementation, recommending specific actions to control point and nonpoint source pollution, and working with the state to get public involvement. Ms.

Steimke explained that the membership of each advisory group is supposed to represent a variety of sectors and interests, including (where applicable), agriculture, mining, non-municipal NPDES permittees, forestry, local government, livestock, Indian tribes, water-based recreation, environmental interests, and the public at large. She added that there is competition to get on certain BAGs and WAGs, and that the activity level of the BAG or WAG depends on the interest level in the area.

Mr. Freeman continued the presentation by providing examples of the practical functioning and challenges of BAGs and WAGs. He noted that the groups meet quarterly, and when the state seeks their monitoring suggestions or TMDL review, the state usually gives a presentation on the topic and asks for their input. Mr. Freeman said that they sometimes get feedback, but when they do not, there is still value in the communication.

Mr. Freeman explained that nine WAGs had been active in the Southwest Basin within the prior 20 years, but only 3 of them had been active on a regular basis. He added that, in several instances, groups of stakeholders did not want to be formally recognized as a WAG. Mr. Freeman noted that BAGs occasionally take on consultation requirements normally associated with WAGs. He highlighted the role played by BAGs and WAGs in deciding how CWA 319 funding gets spent as one of their most influential. Mr. Freeman also mentioned that some of the WAGs are extremely active and get into the fine details. He added that the watershed Technical Advisory Group of a WAG really guides the TMDL process, suggesting models to use, the content of implementation plans, water quality trading frameworks, and means of implementing TMDLs.

Mr. Freeman noted that he had worked in the Lower Boise and Boise-Mores watersheds over the prior three years. The Lower Boise, he continued, has had significant engagement in its WAG, in part because of the large number of point sources in the watershed. Yet, engagement in the Boise-Mores watershed is difficult. Mr. Freeman labeled the Lower Boise WAG one of the most influential in the state because of its diverse representation, regular meetings, variety of technical subcommittees, and open communication. He added that the group operates rather independently.

Mr. Freeman concluded by noting that the state's objective in using BAGs and WAGs is to create transparency in the water quality activities of the state, prevent surprises when documents are issued, and establish ownership in the final products. While involvement in these groups varies across the state, he added, they have been a good way to bring different interests together and develop partnerships to improve local water quality.

A state participant began the discussion portion by commending the structure of the BAGs and WAGs and noting that the state asks much from the members of those groups, suggesting that those tasks require significant expertise. Mr. Freeman replied that they have greater WAG involvement in areas with cities, with more qualified, diverse members, such as lawyers. Another state participant asked how the state keeps a municipality from derailing efforts by denying that there is a problem, to which Mr. Freeman responded that the state has the backbone to say that certain things need to be done.

A state participant shared one of their in-person communication strategies, a water quality fair. He explained that they realized that they needed to change the way that they engaged the public. He said that the two most popular things for public engagement are macroinvertebrates and fish and wildlife, and these became the focus of the fairs, attracting a wide section of the community. The state participant added that the field offices started to take involvement seriously, and the intention was to do one fair for each field office, but after three years, it came to an end because of how labor intensive it was for staff. He noted that the state then tried to join festivals with a booth, but this did not provide a sufficient platform from which to discuss their issues. He said that they still have not found the sweet spot.

Key Points Raised:

- Communicating problems and progress to the public, while vital, is insufficient on its own; it is also important to communicate how the work of the program relates to the public and how they can participate.
- Communications should be designed for users with a secondary or even just elementary education.
- Pictures are key to successful communication.
- Engagement efforts will be more effective if the participants are contributing, not just receiving, information.
- Apps and other means of engagement should provide context, be useful in practice, resonate with a wide audience, and empower action and education.
- Arizona's Water Watch app requires roughly three minutes to create a record, between answering a few yes/no questions and adding a photo and comments.
- Receiving contact information along with data submissions is valuable, to thank first-time users and correct those submitting inappropriate material, as well as to track app usage.
- Developing a useful app is not enough, since advertising it is needed to get users. Advertising can take many forms, from videos and rack cards to news segments and articles.
- Expanding the community of app users can be aided through connections with recreational groups and stores, tourism boards, academia, and others.
- Digital documents, especially ones that fulfill legal requirements, should make it easy to print all of the underlying data.
- Story maps are powerful because they can convey a large amount of information in a short time, but also allow users the opportunity to easily dive into more detail without significantly diverting from the main point. They are accordions, expanding and contracting.
- It is not a leap to build this sort of a product, as the learning curve can be gradual with the copying and pasting of already-developed code.
- Idaho's objectives in using Basin Advisory Groups and Watershed Advisory Groups is to create transparency in the water quality activities of the state, prevent surprises when documents are issued, and establish ownership in the final products.

Session 9: How's My Waterway?

This session featured a presentation by two presenters, with opportunities for questions. The intended outcomes of the ninth session included:

- Participants will be more familiar with the structure and functionality of the *How's My Waterway?* app.
- Participants will better understand the sources of the app's information and flexibility available for the state-specific pages.
- Participants will be able to contextualize the role of the app in the larger scheme of program communication.

Dwane Young, EPA HQ, and Kiki Schneider, EPA HQ: Telling the Water Story

Mr. Young began the session by explaining the purposes for which the new iteration of the *How's My Waterway?* app was created. First, he noted, it was meant to provide the public with usable, meaningful information about water quality from across the many programs that produce that information. Second, Mr. Young said, it was designed to communicate the progress that states, tribes, territories, and EPA are making toward restoring or protecting water quality, to tell the story about how things are getting better. Third, he added, it is a tool to engage the public in understanding the impacts on water and issues related to water.

Mr. Young then detailed the basic building blocks of the app, starting with the fact that it is a mobile-first design, meaning that priority was given to its operating well on a phone. Another key factor, he added, actually drew from the original version of the app – simple language, something that one's neighbor could understand. Mr. Young noted that one of the influences for this version of the app was New Zealand's Land, Air, Water Aotearoa (LAWA) website, which combines water data from across the country into a single interface and conveys it in a manner that is very easy to understand. He said that LAWA answers whether water is usable for swimming, drinking, etc., the basic information that people want to know.

Mr. Young continued by providing a brief overview of the design concepts in the *How's My Waterway?* app. He described it as a work-in-progress, having been distributed for review over the prior six months, with edits being made to it throughout that time. The first concept on which the app is founded, Mr. Young explained, is that all data come through a web service. As a result, data are not stored on the app, rather they are accessed in real time from other sources. He added that, when new data categories or sources are added to the app, the first question is whether that source will expose its data as a service. The second concept noted by Mr. Young was to tell the story at multiple levels, at the local, state, and national level. At the national level, what is the quality of water in the country? At the state level, the story to be told will be determined by the state. The local watershed level includes detailed information about what is going on at the HUC-12, from causes of impairment to restoration and monitoring data. Mr. Young identified the third concept as integrating data across systems. In short, he did not want users to have to know that ECHO comes from the compliance office, TMDL information from the watershed branch, etc. Instead, anyone interested in water quality information could just come to one site. Mr. Young added that it was important for the content to be interactive.

Ms. Schneider then took the stage to provide a demonstration of the app. She showed participants how to access information, from the level of government to the specific jurisdiction. Ms. Schneider noted that the information is mostly built up from the community level and that they plan for the national page to include a new big story every quarter. She added that, in an effort to meet the needs of practitioners as well as the public, there are links to the underlying data as well as references to the web services used, so that people can build what they want from it.

Ms. Schneider continued by walking participants through a search. She explained that the landing page provides a snapshot of what is going on in the community, including the number of drinking water providers, monitoring stations, and permitted dischargers. Ms. Schneider added that, by clicking on a waterbody on the map for which an assessment has been done, a snapshot on the map reveals its use, condition, and assessment status. For some data, she said, users are directed to other websites, but EPA plans to eventually keep people in the app for that information too.

Ms. Schneider then highlighted the fact that the language of the app was set at an eighth-grade reading level, and a glossary of terms is easily found. She noted that the three most common questions from the public with regard to water quality are: can I drink my water; can I swim in the water; and can I fish in the water? Answering these three questions, explained Ms. Schneider, has been a central objective of the app, but doing so is difficult. She described each of the "Community Details" buttons: drinking water, recreation, ecological life, potential issues, detect (providing assessment information), restore (providing information about restoration activities underway), and protect (just text at the moment but EPA wants to allow the uploading of pictures to show what citizens are doing to protect waters and how they interact with water). She added that all maps eventually will have a legend, and EPA wants to incorporate land use data in nonpoint source areas.

Ms. Schneider concluded by detailing the opportunities for comparison via the app. She said that the idea is that users can compare how their county is doing vis-à-vis others in the state. For example, she continued, they could compare the percentage of streams with no impairments detected, impairments detected, and condition unknown. Ms. Schneider added that EPA would like to show restoration and protection statistics as well as measures information on the impaired waters page (more for the advanced users).

Mr. Young then returned to the podium to provide a little more explanation about each of the government-level pages. He said that the state page is where all of the information being gathered through ATTAINS will be posted, adding that the intention is for the Integrated Reports of each state to be accessible through the page. Mr. Young clarified that the national page is mostly for stories. He referenced a discussion from the stakeholder meeting in Denver, where there was interest in telling a story about nutrients: where it comes from and why it is an issue. Mr. Young then added that the local page is more focused on the information, answering specific questions about the locality, although stories could be available.

Starting the question-and-answer period, a state participant asked about the extent to which EPA is able to work with smaller states to customize the state portion of the app to their needs. Mr.

Young replied that customization is tough, but if there are specific stories that the state wants to tell, a PDF document can be uploaded. Another state participant asked whether a column for TMDLs will be added on the "Community Details" page, to which Mr. Young answered "yes." A third state participant praised the fact that the public will be able to access the most recent Integrated Report through the state page, but asked whether that link will be obvious. Mr. Young said that there will be a prominent link or dropdown box directing users to it.

A state participant asked how the app will handle states that do more biological monitoring than chemical monitoring. Mr. Young acknowledged that he was not yet sure, but that the data would need to come through ATTAINS regardless. He added that states need to upload data via WQX. Another state participant asked whether the recommendations from the informal evening session the year before were incorporated into the development of the app, to which Mr. Young replied "yes," that the results of that session helped with several aspects of the app. A third state participant suggested including the scale of the map for reference purposes, which Mr. Young deemed a great suggestion.

A state participant asked whether the scale that was used for the percentage of impaired waters was the state's standard. Mr. Young explained that it is based on catchments, but that the results would not be much different that way. Another state participant followed up that question by asking how the app might tease out statewide impairments, such as theirs for mercury. Mr. Young answered that it could be done through a short note indicating that there is a statewide mercury impairment. That state participant then asked how Mr. Young would most like feedback on the app. He said that he would prefer having a core group of people joining monthly calls on the subject.

A state participant asked how enough interpretation is provided at an eighth-grade level without it becoming misinformation. Mr. Young said that they dedicated significant time to figuring that out, acknowledging that it is broader, more general communication. Another state participant asked whether flow or climate change could be addressed, to which Mr. Young said that their thinking had been that a staff person would be the curator for the stories, and that such issues and factors could be included in them. A third state participant suggested the ability to display permit and CWA 319 project information before and after TMDL development, as a depiction of the impact of TMDLs. Mr. Young described that as a watershed-level story, a deeper dive on the TMDL. The state participant clarified the point, that such before-and-after information on a state or national scale could be powerful. A fourth state participant asked whether it is possible to distinguish permits that have water quality-based limits from those that do not. Mr. Young said that he would need to check with ICIS staff about that. In conclusion, he noted that the conversation had only started, and he stressed that the importance of continuing it, getting new data into ATTAINS, and providing updates.

Key Points Raised:

- The new version of the *How's My Waterway?* app was created to:
    - Engage the public in understanding the impacts on water and issues related to water.
    - Provide the public with usable, meaningful information about water quality from across the many programs that produce that information.

    - Communicate the progress that states, tribes, territories, and EPA are making toward restoring or protecting water quality, to tell the story about how things are getting better.
- The language of the app is set at an eighth-grade reading level.
- The app is divided by level of government:
    - The local page focuses on information, answering specific questions about the locality.
    - The state page is where ATTAINS data will be posted and links to Integrated Reports will be available.
    - The national page is mostly for telling stories about water quality across the country.
- All data come through a web service, so they are accessed in real time from other sources rather than being stored on the app.
- For more advanced users, there are links to the underlying data as well as references to the web services used, so that users can build what they want from it.

Training Workshop Wrap-Up

(1) Dwane Young, EPA HQ; Jim Havard, EPA HQ; and Adam Schempp, ELI: Summary and Next Steps

Mr. Young began his remarks with key points that he would be taking away from the week. The first one he noted was the need for better integration of the CWA 319 Program and GRTS into ATTAINS. Second, he added, is the need for a forum in which states can share the tools that they have developed, so that everyone can access these great products and ideas. Mr. Young also emphasized the importance of improving the reporting functionality in the further development of ATTAINS, including the visualization of data, particularly through GIS. In conclusion, he referenced the productive conversation at the prior night's evening session on measures, suggesting the need to get a better handle on baselines for the new WQ-27.5 measure and to try to better clarify the stories to be told.

Mr. Young then presented a few awards. The first award was presented to the State of Tennessee and EPA Region IV for being the first to submit their Integrated Report to the new ATTAINS. The second award went to the State of South Dakota and EPA Region VIII for being the first to complete the entire ATTAINS process, from submitting the data to having it approved.

Mr. Havard then took the stage and began his remarks by expressing his excitement about the progress being made in the CWA 303(d) Program. In identifying his takeaways for the week, he started with tools, the need to develop, make easily available, and use the tools that aid generalists and specialists in the edge area where the program sits. Mr. Havard also referenced the convening power of the program and the need to exercise it effectively to create excitement and engage people in water quality. He noted his confidence in the Vision and the people of the program, from their skills to their dedication, but identified the challenge of preserving continuity through retirements, job changes, and shrinking budgets. Mr. Havard stressed the

importance of training and sharing training resources. He also highlighted the critical role of communication, not just to reach but also to connect with stakeholders and the public, so they understand what the program does and how to help ensure good water quality.

Mr. Havard subsequently focused his comments on nutrients, noting that the use of narratives for assessment is still a very rich area, and that the process of developing and vetting methods can help with buy-in. He also highlighted the importance of stakeholder engagement and the aid that science, models, and tools can offer toward that end. Relatedly, added Mr. Havard, communication of what the problem is and why it is important is difficult but critical to success; for example, "Is nutrients not a good thing?" He also emphasized the progress on and potential in "alternatives" when it comes to addressing nutrient-related impairments. He then referenced Tom Stiles' comments regarding the "math and the path," that more detail is needed regarding the path, particularly for permitting purposes.

Mr. Havard spent a few minutes on the topic of "alternatives." He expressed his surprise in learning that there have been 87 Vision "alternatives" developed. He identified the key to "alternatives" as being a plan to meet water quality standards, but he noted a desire to remain very flexible about them, not setting rigid criteria. Mr. Havard emphasized that the guidelines are more of a tool than a checklist, but he noted the importance of being strategic about when to use "alternatives." He reiterated that, if a water is on the CWA 303(d) list, a TMDL is required, but the "alternative" can be pursued. If the "alternative" does not make progress toward meeting water quality standards, though, the waterbody will need to be reprioritized for TMDL development.

Mr. Havard praised the bright future of ATTAINS. He noted that there is still much to do, though, and coordination is key to its success. Mr. Havard also noted the enthusiasm around protection, adding that more dialogue is needed to identify exactly what it means. He referenced the draft FAQs document on protection recently released for review. Regarding monitoring, Mr. Havard identified the key to future success as being synergies with partners. Alluding to the litigation breakout, he highlighted the importance of public comments, as signs of the pitch about to be delivered, and the value of reasoned articulation for how comments are handled.

Mr. Havard continued by noting that dialogue in the CWA 303(d) TAS breakout was productive, but more is needed. He added that technical assistance, further integration, and continuation of the ATTAINS pilot project also are necessary. Acknowledging the wide variation in capacity across tribes, he suggested continued communication and collaboration even if a tribe is not ready to apply for TAS. Mr. Havard then alluded to the measures session from the prior evening, identifying two types of measures for the CWA 303(d) Program: planning (TMDLs and lists) and outcomes (water quality restoration). He added that the next step is further dialogue with states on the draft measures being developed. Finally, referencing the sessions earlier in the morning, Mr. Havard made special note of the opportunities for water quality assessment stemming from greater engagement with the public, specifically the collection and processing of their data contributions. He specifically praised the story map presentation and initiative provided by Mr. Shull from Pennsylvania.

Mr. Havard then turned to what was ahead. He identified the open season for Vision priorities, the ACWA modelling workshop in Denver, and the ACWA nutrient TMDL and permits workshop in Biloxi. Mr. Havard again highlighted the fact that most states will be updating their nonpoint source management plans in the next two years, presenting a good opportunity for coordination with that program.

Mr. Havard concluded with a list of actions for EPA. He began with creating a shared resource of modelling expertise. Mr. Havard noted that not every region has strong modelling capacity, but certain regions and EPA Headquarters have expertise that should be tapped for the benefit of everyone. He added that, in looking at the modeling support network, how to choose models, what to look for, how to work with contractors, and identifying red flags are key. Mr. Havard also noted the need for a TMDL 101 training, similar to the Water Quality Standards Academy. He emphasized that the development of such a training course would need to be done collaboratively, not just by EPA. Mr. Havard suggested hands-on training and online modules as potential components of the product. He noted that EPA cannot commit to all of this at once, but that the conversation and planning need to continue. Mr. Havard added that communications trainings, especially how to communicate technical information to lay audiences, would be valuable. He also highlighted the need to share information, like bacteria source tracking and assessment methods with narrative nutrient criteria, through a repository of case studies and lists of methods and approaches across the states.

Mr. Schempp then provided a few closing statements before turning the microphone over to Traci Iott of Connecticut for the send-off. He started by reiterating his appreciation to the participants for taking the time from work and home, and in many cases traveling great distances, to be a part of the event. Mr. Schempp emphasized that their participation makes the training workshop what it is, from presentations; to in-class discussions; to the conversations at breaks, meals, and evening events. He expressed particular appreciation to those who helped plan and execute the training workshop. Along those lines, Mr. Schempp said a few words in recognition of Doug Norton's pending retirement. He thanked Mr. Norton for his contributions to the training workshops since the very first one and noted that he will be sorely missed, perhaps as much around the bonfire as at the podium or with others gathered around a computer screen. Mr. Schempp called Mr. Norton a pioneer, creative, immensely talented, a phenomenal listener and collaborator, and incredibly personable. He then offered the floor to Mr. Norton.

Mr. Norton addressed the audience, noting that he had been in the CWA 303(d) Program for 26 years, and he never left because it never got stale. He called it a great place to be and referenced his last 12 years, when he was working directly with states, as having been the most enjoyable of his career. Mr. Norton concluded with a warm thank you to everyone.

(2) Traci Iott, CT: Send-Off Remarks

Ms. Iott began the send-off remarks by expressing her awe in the amount that she learns from the participants of the training workshop every year. She added that she is inspired and humbled by the passion and spirit that people bring to the event and to their work. Ms. Iott reiterated the jurisdictional composition in the room: 50 states, 5 tribes, 3 territories, and the

District of Columbia, as well as all ten EPA regions, EPA Headquarters, ACWA, and NEIWPCC. It is an incredible event, she concluded.

Ms. Iott alluded to the subtitle of the training workshop, noting that the CWA 303(d) Program stands at the midpoint of the Vision. She explained that part of moving forward is understanding where the program has been. Ms. Iott said that the Vision was developed and has been implemented through a collective desire to produce something great. It started at the 2011 training workshop, she added, at which there was much discussion about the challenges to water quality management and opportunities through tools and communication. Ms. Iott acknowledged the similarities in themes from that year to the current one, but noted that many states were emerging from consent decrees and trying to figure out what is next and where to go. One of the takeaway points from that year, she said, was that the program would only be successful if it was cooperative and collaborative, both within itself and with partner organizations, and one size was not intended to fit all. States, tribes, and territories were interested in being accountable, she explained; they wanted to meet legal obligations, but they wanted to switch the focus from pace to environmental outcomes.

Over the course of the following year, continued Ms. Iott, many meetings and calls occurred, and when people reconvened at Shepherdstown the following year, the first presentation concerned what might be included in a ten-year vision for the program. She noted that it was clear then that prioritization was critical, and science and tools would be needed from EPA. Ms. Iott said that the Vision was published in 2012, and after more engagement and discussion, it was finalized in 2013. If you go back and look, she added, the themes from 2011 are there.

Ms. Iott described the implementation as a challenge because one size does not fit all, but the states each have set their priorities. Over fifty different programs were possible, which Ms. Iott labeled a generous approach by EPA. The states have stepped up, she added, submitting their priorities in a timely fashion, and with thoughtful engagement of the public, not to mention the advancements in tools and science, as demonstrated so well by the presentations from earlier in the morning. Ms. Iott called it an amazing push forward to improve the program.

Ms. Iott then took a moment to recognize the individuals present that day who had participated in the 2011 and 2012 training workshops, as she put it, on the ground floor. She recommended contacting those individuals for any questions about the history of the Vision and the program generally, and she commended them for their leadership and commitment.

Ms. Iott expressed her surprise at the continuity of the program and these training workshops despite so much turnover in staff. She noted that the Vision has been so completely incorporated into the CWA 303(d) Program that various changes have had little effect on implementation. Ms. Iott consequently suggested that, while only half of the years have elapsed in the ten-year period, the program has made it. Furthermore, 2022 will include celebrations, but it is not the end, she continued; prioritization and protection will not end in 2022 because the program has a good thing going.

At the halfway point, she concluded, the program is focusing on nutrients, like it was in 2012, but the conversation is a little different, and progress has been made. She was impressed by

the resolve of program staff to lean into a challenge, rather than back away from it. Ms. Iott noted that the program has not lost speed; if anything, it has gained momentum. She requested that participants celebrate life at the edge and keep the energy going to do great things.

APPENDIX 1: TRAINING WORKSHOP AGENDA

ENVIRONMENTAL LAW INSTITUTE®

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2018 NATIONAL TRAINING WORKSHOP FOR CWA 303(d) LISTING & TMDL STAFF

SUCCESS IN THE SECOND HALF OF VISION IMPLEMENTATION

National Conservation Training Center
Shepherdstown, West Virginia
May 30 - June 1, 2018

TRAINING WORKSHOP AGENDA

Made possible through a cooperative agreement with the United States Environmental Protection Agency

PURPOSE OF THE TRAINING WORKSHOP

To provide an opportunity for staff from state and territorial Clean Water Act Section 303(d) Listing and TMDL programs and tribal water quality programs to discuss obstacles and learn proven and emerging approaches to achieving their goals for 2022.

WORKSHOP OBJECTIVES

- Learn **strategies for addressing the unique challenges of nutrients** in CWA 303(d) Program implementation.
- Learn about state, tribal, and territorial **practices employed to improve collaboration** among programs and across jurisdictions to restore and protect water quality.
- Learn about the **improvements to tools and data systems** for decision-making and water quality data reporting.
- Learn about the innovative ways in which states and the EPA are **communicating water quality information** to stakeholders and the public.
- Enhance the **network of listing and TMDL professionals** by expanding and improving communication among the states, tribes, and territories and with EPA regions and headquarters.

OUTPUT

A final report summarizing presentations and discussions from the training workshop. The report will include a summary of individual input from workshop participants and may serve as a reference for program personnel implementing their responsibilities consistent with the Vision.

AGENDA

Tuesday, May 29 ***Arrival, Check-In, and Registration***

2:00 pm – 8:00 pm	NCTC Check-In and Training Workshop Registration Main Lodge
5:30 pm – 7:30 pm	Dinner Commons Dining Room
8:00 pm – 9:00 pm	Informal Welcome Murie Lodge, Lounge Area

Wednesday, May 30 ***Training Workshop Day 1***

6:30 am – 8:30 am	Breakfast Commons Dining Room
8:30 am – 9:45 am	**Welcome, Introductions, and Training Workshop Overview** Auditorium Greeting *Adam Schempp, ELI* Opening Remarks *John Goodin, EPA HQ* Introduction *Jim Havard, EPA HQ*
9:45 am – 10:15 am	**Session #1** **Nutrients Overview** Auditorium Introduction *Adam Schempp, ELI* The National Perspective on Nutrients *Tom Wall, EPA HQ*

Session #1 Outcomes:

- *Participants will better understand the overall objective of the day's sessions.*
- *Participants will be more familiar with the details of the nutrients problem at a national level.*

10:15 am – 10:45 am Morning Break

10:45 am – 12:30 pm **Session #2**
Nutrients Breakouts
Breakout Rooms, Various Locations

This session will consist of six breakout groups, with each group addressing a different common programmatic problem related to nutrients. Each group will be led by a moderator and have an assigned reporter. Each participant is assigned to a group based on his/her topic preference expressed prior to the training workshop.

12:30 pm – 1:30 pm Lunch
Commons Dining Room

1:30 pm – 2:30 pm **Session #3**
Report Back and Discussion
Auditorium

How can waters best be assessed for nutrient impacts using narrative criteria?

Kim Cenno, NJ

How can the role of nutrients best be captured in biological impairments?

Alan Wittmuss, SD

How can nutrient TMDLs best be developed as a translation of a narrative standard, generally?

Dave Werbach, EPA R5

What is the best way to develop nutrient TMDLs for algae-related impairments in lakes?

Trish Rielly, MO

How do you best allocate nutrient load with mixed sources?

Randee Tubal, HI

What steps are helpful to take in developing "alternatives" for nutrient impairments?

Chris Hunter, EPA HQ

Facilitated Discussion

Sessions #2 and #3 Outcomes:

- *Participants will be more familiar with the strategies that others have used to address certain nutrient-related programmatic challenges, what has worked and not worked, and why.*
- *Participants will have developed new strategies for addressing these programmatic challenges.*

2:30 pm – 3:00 pm Afternoon Break

3:00 pm – 4:00 pm **Session #4**
Supporting Nonpoint Source Implementation
Auditorium

Panelists

Chris Janssen, KS
Trish Rielly, MO
Carl Adams, UT
Benjamin Rau, WA
Kevin Kirsch, WI
Cyd Curtis, EPA HQ

Facilitated Discussion

Session #4 Outcomes:

- *Participants will be more familiar with various ways in which the CWA 303(d) Program effectively supports the restoration efforts of the Nonpoint Source Program.*
- *Participants will have gained tips for working with the Nonpoint Source Program.*

Potential Discussion Questions:

- How has the CWA 303(d) Program helped Nonpoint Source Program efforts to address nutrient-related problems?
- How else could the CWA 303(d) Program help those efforts?
- What have been key elements of a good working relationship between the CWA 303(d) and Nonpoint Source Programs?

4:00 pm – 5:00 pm **Session #5**
Supporting Permitting
Auditorium

Interfacing Nutrient TMDLs with NPDES or
"After 6 Years of the Vision, How the Hell Did We Miss This?"
Tom Stiles, KS

Commonwealth of Virginia's Chesapeake Bay Watershed General Permit

Allan Brockenbrough, VA

TMDLs Supporting Permitting and Alternative Compliance Strategies

Kevin Kirsch, WI

Facilitated Discussion

Session #5 Outcomes:

- *Participants will better understand the characteristics of TMDLs that can aid permitting program staff in drafting permits.*
- *Participants will be more familiar with innovations and needs in permitting and how TMDLs have supported them.*

Potential Discussion Questions:

- What actions in TMDL development have helped permit writers implement nutrient reduction by point sources?
- How has coordination between permitting and CWA 303(d) staffs improved, and what steps can enhance that relationship?
- Have tools, procedures, or documents aided coordination between the two staffs?

6:00 pm – 7:00 pm Dinner
Commons Dining Room

7:00 pm – 10:00 pm Bonfire

Thursday, May 31 *Training Workshop Day 2*

6:30 am – 8:30 am Breakfast
Commons Dining Room

8:30 am – 9:30 am **Session #6a**
Small Group Training I
Breakout Rooms, Various Locations

This session will consist of five distinct trainings, each focusing on a different topic. Each participant is assigned to a training based on his/her topic preference expressed prior to the training workshop.

- ATTAINS User Interface I: Data Entry and Batch Upload [1st half]
- Water Quality Portal Data Discovery and Data Analysis Tools

- Alternatives
- The IR Transition
- Citizen Science

9:30 am – 10:00 am Morning Break

10:00 am – 11:00 am **Session #6b**
Small Group Training II
Breakout Rooms, Various Locations

This session will consist of five distinct trainings, each focusing on a different topic. Each participant is assigned to a training based on his/her topic preference expressed prior to the training workshop.

- ATTAINS User Interface I: Data Entry and Batch Upload [2nd half]
- Managing Large Datasets with R
- Monitoring
- Litigation Update
- Modeling

11:15 am – 12:15 pm **Session #6c**
Small Group Training III
Breakout Rooms, Various Locations

This session will consist of six distinct trainings, each focusing on a different topic. Each participant is assigned to a training based on his/her topic preference expressed prior to the training workshop.

- ATTAINS User Interface II: The IR Cycle Promotion and EPA Review
- ATTAINS for Managers
- Open Forum: Bacteria
- Stressor Identification
- Protection
- CWA 303(d) TAS

Session #6 Outcome:

- *Participants will better understand issues, procedures, and tools that are of particular importance to the successful implementation of their respective programs, and to achieving their goals for 2022.*

12:15 pm – 1:15 pm Lunch
Commons Dining Room

1:15 pm – 3:00 pm **Session #7**
Regional Meetings and Additional Trainings
Breakout Rooms, Various Locations

This session will consist of 6 regional meetings, one for each of EPA Regions 3, 4, 5, 6, 9, and 10, each with the state, tribal, territorial, and EPA participants from that region. Participants from EPA Regions 1, 2, 7, and 8 will participate in one of the following trainings based on their respective preferences expressed prior to the training workshop:

- A Combination of the ATTAINS I, ATTAINS II, and ATTAINS for Managers Trainings (Demo Only)
- Monitoring & Modeling (consecutively)

Session #7 Outcomes:

- *Participants will be more familiar with the needs, challenges, and views of others in their respective regions.*
- *Participants will have resolved, or at least advanced conversation on, issues important to the states, tribes, and territories of the region.*
- *Participants will better understand issues, procedures, and tools that are of particular importance to the successful implementation of their respective programs, and to achieving their goals for 2022.*

3:00 pm – 3:30 pm Afternoon Break

3:30 pm – 5:00 pm Afternoon Activities

6:00 pm – 7:00 pm Dinner
Commons Dining Room

7:30 pm – 8:30 pm **Informal Evening Sessions**

- *Navigating Measures in Today's EPA*
  Ding Darling Lodge, Lounge Area

- *Identifying Training and Resource Needs*
  Murie Lodge, Lounge Area

Friday, June 1 *Training Workshop Day 3*

6:30 am – 8:30 am Breakfast
Commons Dining Room

8:30 am – 10:00 am **Session #8**
Communication
Auditorium

Introduction
Stephanie Santell, EPA HQ

Citizen Science and Technology: There's An App For That!
Jade Dickens, AZ

Story Map: Looking Below the Surface &
Draft 2018 Pennsylvania Integrated Water Quality Monitoring and Assessment Report
Dustin Shull, PA

Communicating with the Public via BAGs and WAGs
Amy Steimke & Graham Freeman, ID

Facilitated Discussion

Session #8 Outcomes:

- *Participants will be more familiar with the diverse ways that other states, tribes, and territories have sought to improve communication with stakeholders and the public.*
- *Participants will better understand the outcomes of different communication methods in different contexts.*

Potential Discussion Questions:

- In what ways has your jurisdiction sought to facilitate two-way communication with stakeholders (receiving as well as providing information) through digital means, and with what results?
- In what ways has your jurisdiction sought to improve the effectiveness of documents (digital or physical copies) in conveying information, and with what results?
- What in-person communications, from presentations, to standing meetings, to water fairs or a booth at an event, have been effective in reaching desired audiences?

10:00 am – 10:30 am Morning Break

10:30 am – 11:30 am **Session #9**
How's My Waterway?
Auditorium

Telling the Water Story
Dwane Young, EPA HQ

Session #9 Outcomes:

- *Participants will be more familiar with the structure and functionality of the How's My Waterway app.*
- *Participants will better understand the sources of the app's information and flexibility available for the state-specific pages.*
- *Participants will be able to contextualize the role of the app in the larger scheme of program communication.*

11:30 am – 12:00 pm **Training Workshop Wrap-Up**
Auditorium

Summary and Next Steps

Dwane Young, EPA HQ
Jim Havard, EPA HQ
Adam Schempp, ELI

Send-Off Remarks

Traci Iott, CT

12:00 pm – 12:45 pm Lunch
Commons Dining Room

NCTC Check-Out & Departure

1:00 pm Departure of Shuttle Bus for Dulles Airport
Murie Lodge, Parking Lot

APPENDIX 2: PARTICIPANT LIST

2018 NATIONAL TRAINING WORKSHOP FOR CWA 303(d) LISTING & TMDL STAFF

SUCCESS IN THE SECOND HALF OF VISION IMPLEMENTATION

National Conservation Training Center
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APPENDIX 3:
COMPILATION OF TRAINING WORKSHOP PARTICIPANT EVALUATIONS

Fifty-six workshop participants completed an anonymous Participant Evaluation Form (provided in the resource binder materials). The combined numerical results from the evaluations indicate an overall event rating of "Very Good-to-Excellent," across all categories. In addition to the numerical responses, we received many written comments, which are reproduced here.

Participant Evaluation Form: Compilation

Scale: 5 = Excellent, 4 = Very Good, 3 = Satisfactory, 2 = Fair, 1 = Poor

A. The Workshop—Overall

Information Presented
5 (31) **4** (25) **3** (0) **2** (0) **1** (0) **AVG: 4.55**

Workshop Materials
5 (30) **4** (20) **3** (4) **2** (1) **1** (0) **AVG: 4.44**

Workshop Organization
5 (45) **4** (10) **3** (1) **2** (0) **1** (0) **AVG: 4.79**

Group Interaction
5 (36) **4** (18) **3** (2) **2** (0) **1** (0) **AVG: 4.61**

Session Facilitation
5 (30) **4** (25) **3** (1) **2** (0) **1** (0) **AVG: 4.52**

Conference Facility (NCTC)
5 (53) **4** (3) **3** (0) **2** (1) **1** (0) **AVG: 4.89**

Comments:

- I would like to see all presentations in the manual. Where is Tom Wall's excellent presentation for example? Some breakouts were all presentation and no discussion.
- Materials could include more presentations or note pages, but really everything is great and well organized.
- This conference was effective at sharing complex and creative methods to solve problems. I have absolutely expanded my knowledge base and will be improving my techniques at my office. Best conference I have ever attended!

- Overall great workshop! I think it would be nice to get perspective and presentations from states in a variety of regions/states. It can be much more difficult to address certain issues depending on the region.
- I enjoyed my first visit. I would recommend others attending.
- Great discussions! More time in breakout sessions would be good.
- Wonderful event, and I learned how other organizations' and entities' approaches can vary between regions and situations.
- ELI always does a great job in organizing this workshop with the help of the whole group. It is good that past recommendations for the workshop were considered. Thank you for another great workshop.
- Like the breakout groups that were smaller and allowed for greater interaction.
- Great facility and organization was great! Only downside was some of the sessions got derailed and off topic.
- Recommend the breakout sessions have fewer presentations to leave more time for discussion – perhaps one larger presentation followed by a group discussion.
- For group interaction, there were a select few people dominating the breakout sessions. I would have liked to see more facilitation during breakouts so that these characters are not the only ones speaking.
- Very good workshop; a lot to take in at once, so could be longer to spend more time on info, but understand the limitations. Would like to see more "how to" sessions available, or demo sessions.
- Please consider recording (video/audio) for posting on a website and subsequent viewing/listening and download. Maybe have an app (guidebook).
- The binder was pretty lean this year – maybe time to go electronic or combo? The wifi got pretty good and there are good conference apps [guidebook] that can hold the agenda and other materials.
- Excellent! One of the best outcomes is networking with program participants.
- Appreciate the excellent workshop coordination by ELI. Great job Adam and Staff.
- Had power strip in one breakout room, would be nice to be able to plug in everywhere. For some breakouts, ending time was a problem.
- I really enjoyed the full day of breakout sessions. Easier format for discussion.
- Excellent workshop. Easily the best workshop/conference I have ever been to. Well run, organized, and planned. Liked having the smaller breakout sessions. I was able to tailor my experience. NCTC is a great location. Being outside a city led to more networking and opportunities to talk to people from other states and EPA.
- Gets better every year, ELI staff are fantastic!
- Loved the small group sessions on Thursday was very useful.
- The breakout sessions with more intimate communications work best.
- Conference rooms/auditorium could have been warmer. Auditorium needs better wifi coverage. Several good presentations are not in binder (Curtin, for instance). Can we get copies of ALL the presentations that were given?
- Excellent diversity of relevant and timely topics.
- Good variety of topics covered – something for everyone.
- Day of breakouts was a great idea!
- I like the one day dedicated to a specific topic.

- Would have been nice to have presentations from 5/31 to take notes on. The small group breakouts were great. The topics were interesting and it allowed for great discussion and interaction.
- Very much liked the smaller break-out sessions, but thought there was too much information for the time allotted. I would have liked fewer presentations and more opportunity for discussion in the IR transition (6a) breakout. That said, I found the TN presentation to be extremely useful and informative.

B. Goals and Outcomes

How effective was the workshop in satisfying the stated goals and intended session outcomes?

5 (26) **4** (25) **3** (2) **2** (1) **1** (0) **AVG: 4.41**

How successfully did the workshop meet your own expectations?

5 (31) **4** (21) **3** (2) **2** (0) **1** (1) **AVG: 4.47**

Comments:

- I came to learn more about what other programs do to help our program grow. I also wanted to learn more about ATTAINS. I have so many goals/to-dos/questions. Very inspirational info!
- Exceeded my expectations and improved my game plan and hopes.
- The content of this workshop was great! It is also nice to be able to have candid discussion w/ EPA staff and other states.
- I would recommend each person put the intended session outcome as the first slide or have facilitator read it off.
- This was my first trip to the TMDL workshop and it was great! So many ideas to take home and WW contacts.
- Since this was my first time at this conference, I didn't know what to expect, but feel there were several topics/discussions that were educations and will help me in my role.
- Being new to 303(d) and TMDLs, I expected the presentations to go over my head. The presenters took the time to explain the information and built up to more advanced topics that I could follow along to.
- Didn't really know what was expected for the breakouts and our assignments to them. However, discussions in them were very helpful.
- Overall ELI does a really good job at planning and coordinating this training. I really enjoyed the format of the large group and small group training. The breakout and report out was less structured and tended to be more of a gripe session.
- PA presentation on the electronic biennial water quality report was great!
- Very well-run workshop. Very impressed with keeping all on time. This is a great opportunity to meet and talk with state and federal counterparts and share ideas.

- For nutrients breakout and reporting back, I don't feel that the info was presented in an effective way. I would have liked to see each reporter use a template and put their results on the screen.
- Breakouts allowed for good discussions. I suggest mixing up breakouts and plenary sessions. Wednesday seemed like a long day while Thursday went quickly. Field trip time was appreciated along with evening time to get to know fellow participants (opening reception, bonfire). Some presentations may have benefitted by a slide which characterizes state 'quirks' as they pertain to the subject matter.
- Workshop was very informative and well organized. The Thursday breakout sessions were good, only complaint is that some of them were too short and had too many presenters. That didn't leave enough time for group discussion. With longer session times and/or fewer presenters would allow for more discussion.
- A lot of good information.
- Love the break out format – feel like this helps us have a more productive 'working' meeting to move forward, however there were so many and I feel I missed a lot. Combined with a longer turnaround for ELI notes, I feel it will be hard to report back to my coworkers.
- Very effective, as we move to the next half of the vision.
- The rooms, especially my hotel room, were very cold in comparison to the outside seasonal weather. This, I believe, contributed to my coming down with the flu. As a practice in warmer climates we set indoor temperatures 5-7 degrees F lower than outside. Beyond that makes it harder to acclimate to outside…Just my thoughts…control indoor humidity but without cooling further from 75.
- Baby steps – continued engagement needed with regions at multiple levels for successfully moving forward with new practices. $ for travel is important for these opportunities. Love meeting new people and building relationships.
- Job well done, as always. Thank you.
- I still don't have the first clue of how to write a TMDL or implementation.
- Great, great workshop! As a first time attendee, it was a great opportunity to see how other states run their programs, successes and challenges from states, and opportunity to meet and network with other professionals. Kudos to ELI for all the logistics, putting together the agenda, and smoothly running the workshop. Awesome job guys!
- Smaller group sessions very valuable. A lot to take in so good to have smaller groups to exchange ideas.
- Loved the small group sessions. Got to see things more important to me and skip things not in my purview.
- I was hoping for more solutions to our nutrient TMDL problems, but most states have some at home and have a conference just for TMDL writers, modelers, and implementers.
- More time for the breakout sessions.

C. Specific Sessions

Welcome, Introductions, and Training Workshop Overview

- Very good overview/intro.
- Okay, general/generic overview.

- Very exciting and provided a great overview for the week's events.
- Needed more energy to get us going.
- Yay John Goodin! So happy to hear him again. Too bad, no haiku ☹
- John Goodin "edges" speech was great.
- John Goodin is the best. Having EPA Sr. leaders show up at these meetings is important.
- It was really good to hear from program organizers and EPA OWOW the level of support for the training workshops, especially when it comes to nutrient issues.
- Excellent welcoming remarks by facilitator! Pointers about discussing solutions over challenges for group discussions, specified theme (nutrients) and vision of workshop.
- Well done and very informative.
- Great talk by Goodin, great analogy about "edges".
- Great job! Always like hearing HQs perspective on things.
- Excellent as always.

Session #1: Nutrients Overview

- Okay, overall … presentation
- Just learning about 303(d) programs, so I got lost in jargons and acronyms. But learned broad impact of nutrients.
- Found the presentations from other states very interesting. Always great to hear examples from across the Nation on the different issues faced by states, and how they are dealing with them. Good to get ideas from others.
- Basics. Not remarkable.
- Very good remarks to make nutrients the number one issue that needs national attention from point source and NPS activities and the reduction measures that should be taken to address the issue.
- Nutrient impacts using narrative criteria by other states (jurisdiction) interesting. We're looking into eutrophication method indicators relevant to our jurisdiction.
- Informative talks by Adam, John Goodin ~ "Edges", Jim Havard ~ Measures and Timeliness Engagement, Tom Wall ~ answers v. challenges.
- Would have liked a bit more on the national level – this is our ammo for justifying resources for nutrient work to our upper management.
- Excellent.

Session #2: Nutrients Breakouts

- Alternatives – my breakout was good. I learned a lot about alternatives with great examples from PA, TN, and AZ.
- Developing alternatives for nutrient impairments…, Good engagement, variety of perspectives, regional, state, good presenters!
- Alternatives could take 2-3 sessions.
- Alternatives: Am usually skeptical about 5-alt, however presentations by PA (Scott Heidel) and TN (David Duhl) were encouraging. PA's Kishacoquillas Creek 5-alt is basically a TMDL plus (implementation). TN's example has lots of rigor, not just plans and ideas of what will achieve uses and standards, but has stakeholders, projects, funding, etc.

- I wasn't sure there would be much value in a nutrient focus when we aren't really focused on nutrient TMDLs at the moment, but the alternatives breakout was great. It was nice to have example of success and hear from EPA regional folks that are skeptical that alt. approaches will work and why they don't think it's the right tool. My favorite of the breakouts.
- Alternatives – I thought we had a good session with great presenters and discussion. Hope others enjoyed.
- Alternatives – Great! Helped me understand difference between alt plans and 4b.
- Alternatives – very good. Presenters were interesting and covered a spectrum of approaches. Facilitator was very good. Led to great discussion.
- Alternatives – Amy was a great facilitator and kept the conversation going. Learned a great deal from the group.
- How can nutrient TMDLs best be developed as a translations of a narrative standard, generally? This breakout session allowed good presentations and discussions.
- How can nutrient TMDL best be developed as a translation of a narrative standard, generally? Based on the narrative standards the focus has been to limit TP effluent in NPDES permits for major discharges and this approach was similar in many states.
- TMDL translating narrative criteria – The breakout was excellent, good discussion. Good examples were provided. Much better than last year's breakout.
- How can waters be best assessed for nutrient impacts using narrative criteria – I found the various areas of the US very useful to learn different nutrients assessment in different situations.
- How can waters be assessed for nutrient impacts using narrative criteria: Dustin Shull's (PA) presentation on tweezing out eutrophic effects presented us with another way to look at our lakes and riparian areas. I forget the name of the presenter after Shull, her presentation also was very thought provoking.
- Nutrient Assessment: good presentations, good discussion, enough time to discuss
- Allocating Nutrient Loads with Mixed Sources: I liked the informal structure of the discussion. I felt like that setting (no formal presentations) encouraged participation from everyone in the room.
- Allocating sources – good group discussion, one of the most valuable sessions
- Mixed sources – liked how session opened with each participant introducing themselves and their state's experiences with mixed sources. Well facilitated.
- How can role of nutrients best be captured in biological impairments? A recurring theme was that the assessment method for aquatic life use impairment for nutrients, specifically, need to be more detailed – a session on this specific topic would be helpful.
- Bio impairments: good session. Still no magic bullets for me (no, I didn't actually expect any).
- Role of Nutrients captured in bio impairments: Good discussion – most attendees seemed to be there to get ideas from the states who are doing these assessments – I think that was accomplished.
- Would have liked these sessions spread out among different time slots so we could have attended more than one of them. There were 3-4 I'd have liked to attend. Bio assessment session was good, good presentations and discussion

- Algae breakout didn't address algae. However, it was very informative about modeling, which many were interested in. Kevin Kirsch was great!
- Limit the number of presentations to allow focus on the questions asked. Our group tended to get hung up on one topic. Perhaps in the future provide an outline or more guidance on how to structure the breakout discussion. My group focused not on discussion, but the main concern.
- Great info. Need to report back to my counterparts developing numeric criteria.
- Interesting, relevant, helpful.
- Very good, but here's where solutions were sought and none were found. Maybe specify a goal for each breakout for the group to work towards. Otherwise it becomes a gripe session and no paths forward are found.

Session #3: Report Back and Discussion

- This session was helpful.
- It is hard to condense after breakouts well, but I think I got the gist.
- Good to hear from each breakout session.
- It sounded like all the groups had productive and good discussion. However, it was a bit unclear if there were any real different points worth furthering discussion with the larger group. I didn't get much from the report back.
- This went over my head, but informative for additional ways that the current program can be improved.
- Provide structure on what info should be reported out. Heard from others that they did not find the report outs to be very beneficial and they did not gain much more info.
- Are there preferred models that should be used to develop TMDLs? What monitoring should be done to capture HABs and nitrogen fixers?
- Maybe helpful to have a more guided report back so that everyone covers some basics from their session.
- See comments for B. The four presentations during the "assessing for nutrients using narrative criteria" were very effective.
- Not very effective. Not much time for engagement. Would have preferred the time spent in another breakout.
- This was okay, Always hard to capture 2 hours in 5 mins. Maybe longer time for this? Maybe have groups spend last ten minutes focusing on what they want to report instead of leaving it to one person. Some key points get missed.
- Several alternatives were discussed from participants such as using biology to list impaired stream and develop a site specific TMDL for the watershed. Also used Eco region criteria, data needs: So, pH, TP, TN, Chlorophyl-a; One size approach does not meet every watershed's needs.
- I liked the group sizes, so I understand dividing up into 6 sessions. However, the report back session #3 has several similar findings. Perhaps the presenters could have discussed these and condensed it down to the primary findings. Less redundant that way, although this may have taken more time for the presenters.
- Ok, challenging to focus on outcomes and take away summaries from panelists – kind of a blur.
- This was super helpful.

- Some groups were better organized for the report than others.
- Not sure how well this worked – seems important to share takeaways but another breakout would have been more valuable for me.
- Probably need more time for this.
- I've never been a fan…
- Pretty good, but level of reports varied a lot and it helped when there were visual records/reports.
- Perhaps a different format would work better, something a bit more engaging or maybe it was the time of day, but I felt like the audience was not very interested in the report outs – could also be that folks got what they were looking for from each individual session they attended.
- Too long. Maybe more consistency in the reports would help.
- Good. Report outs are hard for those not in the specific session, but are necessary. Keep doing this!
- This was a great idea. You always worry about what you're missing in other sessions. This took care of that.
- Excellent summary by all and helped gain insight into sessions not attended. Might help to identify who attended each session so you know who to ask Qs.

Session #4: Supporting Nonpoint Source Implementation

- Great session. Nice to see how other states connect TMDL/319 to see movement in restoration.
- I learned coordination and interaction seems to be key in NPS implementation.
- I really enjoyed this session as I do both TMDL/NPS. Would a future conference with TMDL/NPS staff be beneficial (like the ATTAINS folks the last 2 years)?
- Good.
- This session allowed me to examine ways that I can utilize current funding to initiate/ implement a 303(d) and TMDL program. Provided great information.
- TMDL and NPS are in the same unit in Colorado so this session provided some ideas to improve both programs that should have fewer obstacles to implement and make reality.
- I liked the panel style format and different perspective each of the states brought.
- I like that "waterbodies on the edge" are targeted by RFP and that there are quarterly watershed agency meetings.
- The majority of NPS-WPB have relied on TMDL projects for load reductions … when addressing nutrient issues as follows: NPS program and TMDL program in some states have worked together to develop hybrid projects, and nutrient loss reduction strategy (point-source and non-point source).
- Sorry, I missed a great part of this as I could not stay awake – jet lag, I'm afraid. Perhaps an hour allotted here would have allowed a nap for distance travelers and for the presenters in session #2 to consolidate their findings.
- Lynda Hall's stats were good. Glad she was there.
- This might be a great topic for a breakout next year – my state struggles with this.
- Good info – liked the open discussion format.

- Good to hear how all programs are integrated. A lot to digest. Would be helpful to see how all states are organized with monitoring and assessment (303d), TMDL, NPL/319, and permitting.
- Good discussion.
- Good info! Lots of ideas on how to leverage 319 funds in alternatives.
- Good.

Session #5: Supporting Permitting

- The importance of good TMDLs and providing TMDLs in a format interfacing with permit writers was highlighted. Some of the trading and technical details in the presentations were tough to follow.
- Good reminder for collaborating closer with permitting groups.
- Excellent.
- This was a bit over my head, but it was a learning experience for me on future goals for 303(d) and TMDL program.
- Good presentations from states, trading examples.
- Great points that haven't been discussed greatly.
- The discussion was heavy on "implementing TMDLs in permits". I would have liked to hear more about flexibilities/successes in writing TMDLs to better support implementing the WLAs. E.g. – good examples of explicitly stating "assumptions and requirements of TMDL WLAs in the TMDL report".
- Best of two afternoon sessions.
- Impressed by all of the trading programs. Are there a variety of ways to engage PS or is trading the only way?
- Several states are taking similar approaches working with their respective water programs to address nutrient issues. Until nutrient criteria become available, technology based efficiency limits for TP and TN are being included in NPDES permits.
- In session, many people were nodding off again, a little more of a break OR a stroll around the paths would energize everyone and wake them up after lunch.
- Presenters were very knowledgeable. Kevin's presentation was pretty intense. Great VA has nutrient trading regs.
- This might also be a good idea for a breakout.
- Needed more time or hold presenters to allocated time slot.
- This was one of my favorite. Good examples of what is needed and what is working.
- Good discussion.
- Not being a permit person, I learned a lot.
- Very good. Would be good to have continued discussion on this in future conferences. The regulated community is often the biggest obstacle to TMDL development. I would like to hear more about what flexibilities NPDES permit writers are granted to stay consistent with a TMDL, but result in something that is implementable.

Session #6a: Small Group Training I

- IR Transition – excellent session. It would have been good to have a live demo of some of the IR websites.
- Integrated Report Transition – examples were good, timeframe was right.

- The IR Transition – great presentations.
- IR Transition: very helpful to hear other state stories.
- IR transitions: good overview
- IR transition = excellent! Great presenters.
- ATTAINS – awkward and difficult to fit in to a short timeframe.
- ATTAINS User Interface I: Data entry and batch upload (1st half); very good training for transition from ADB to ATTAINS.
- ATTAINS user interface and batch upload (1st half): very informative, networked with the right group to rectify out jurisdictional data management.
- Alternatives – I really appreciated the examples and discussion about alternatives. I feel I have a better understanding of the process and pitfalls.
- Alternatives – This alternatives workshop was not as good as the previous one. It was more oriented towards bureaucracy of an alternative … "acceptance" and EPA.
- Alternatives – This breakout included good examples, discussion on the alternatives type. It also led to some discussion of misconceptions/differences between regions.
- Alternatives: I was worried signing up for 2 alt approach sessions would be repetitive but it wasn't. I wish there had been a little more time to discuss this topic, but overall I liked this session.
- Alternatives – the presentations were extremely informative - I wish more states presented on alternatives to the whole group. EPA regional reps at end of session ended on a bad note by bringing up litigation concerns. They are valid concerns but delivery was somewhat negative.
- Alternatives: interesting the various views of the EPA regional staff as it pertains to accepting alternatives.
- Alternatives: regional staff inconsistent with guidance and 'approvals'. For such a big initiative, I wish there was better communication and less barriers.
- Alternatives: presentations went well. EPA regions need to get on the same page with a consistent message.
- Alternatives – Great! (Except for time management at the end of the session).
- Alternatives – great discussion. Interesting to hear about different state's approaches.
- Alternatives – good discussion, important topic. Could have used more time.
- Alternatives: Good. Fixed some misconceptions. Thanks!
- Citizen Science – Could have used more discussion time to learn from others.
- Citizen Science – Great examples and presentations from states.
- Citizen Science: In my breakout I think there were too many presentations which limited the time for discussions. For example – our breakout had three presentations; there were lots of questions and comments but not a lot of time.
- Citizen Science: Excellent presentations by Jade Dickens, Ansel Bubel, Carl Adams, and Sean Regalado.
- Citizen science – excellent presentations. Could have used 20 more minutes.
- Citizen Science – Most of the presenters had the benefit of a state-run laboratory as a resource. I would like to hear from states without a state lab and how they handle CS.
- Citizen science – great to see/hear what other states are doing. Presentations somewhat limit additional discussion.
- Citizen Science: great presentations, lots of good, different info.

- Data Discovery Tools: Too much time spent on presentations. Discussion had to be cut off.
- Data discovery → very helpful. Data analysis → continue to talk to states to see how they automate to reduce redundancy.

Session #6b: Small Group Training II

- Managing data w/ R – needed more R background for class.
- Managing Large Datasets in R – My mind is blown – I am not a programmer but want to learn more about R. Very inspiring!
- Managing Large Datasets with R: less than 5 minutes for discussion. Not nearly enough time.
- Managing large datasets with R – presented approachable way to manage, utilize, and interpret various datasets. I found it very helpful to current situation.
- Using R to Manage Large Datasets: loved this session. I was inspired by what other states are doing using R. I think of R as the stats and data management coop. Everyone willing to share what they have.
- Managing large datasets with R – I'm taking a stats class in a few weeks, so it was nice to start looking at R beforehand, and I liked the less technical presentation on how you can use R for assessment and reporting.
- Intro to R for large data: makes me want to explore "R"
- Litigation – okay – I learned documentation was key.
- Litigation update: helpful in understanding the importance of documentation.
- Litigation: One person presented and took questions along the way – found this very informative. People were very engaged in the discussions. This could have been a large group discussion/training.
- Litigation: the list of AR needs from the legal perspective was helpful – could EPA distribute as a hand out?
- Litigation: the discussion on ARs seemed more appropriate for EPA only, not states. It would be helpful to hear how the cases discussed affect other regions/states.
- Litigation update – went through some slides too quickly; rather than pending litigation would have preferred case that were resolved/ruled on.
- Litigation – great presentation
- Litigation – lots of great material. Would have been helpful to have has info/slides before hand. This group needed a lot more time. Did not finish the material.
- Litigation. Excellent presentation – AR tutorial very valuable, getting copies of the presentation will be very helpful within EPA. This message/information has been lacking in our training!
- Litigation update: would have liked more discussion on the cases and less on admin record. Hoped to hear the whats, whys, strategies/outcomes
- Best take-away: Public comments are a lens in to future litigation, use them as such.
- Litigation - could be better (more clear) but a lot to overview.
- Monitoring – good discussion. More time could be dedicated to monitoring (ambient/assessment, TMDL, effectiveness, etc.)
- Monitoring – I think this topic might be better suited for a larger audience or one that allows for more time.

- Monitoring – Good interaction, Sarah Lehmann did a nice, simple framing of monitoring design, objectives, analysis, and rest of 10 elements in monitoring guidance.
- Monitoring – look forward to the COMPENDIUM…thanks to Sarah and Lynda.
- Monitoring – At the end, the discussion about what monitoring occurs, and what is then used for assessment, was occurring. Focusing direct on this topic, and taking a poll from all states, would be interesting. E.g. VA doesn't associate causes until TMDL monitoring, some states use prob. Data and others don't – would like to continue this discussion.
- Modeling – good introduction to modeling. Would have been good to get some type of summary or handout from the presentation.
- Modeling – I wasn't sure what this session was about related to modeling – it ended up being a modeling 101 presentation. I think it would have been better to have an open forum for modeling needs, issues, etc.
- Modeling: highly qualified presenter.
- Modeling: Good, but not enough time. Modeling is too big a topic to discuss in any detail with the time allotted. Not a good conference for modeling training.
- Modeling – a lot of information presented very quickly. Hoping that a copy of the presentation will be made available.
- ATTAINS user interface: data entry and batch upload (2nd half) – unorganized, presenter on a fast paced mode.

Session #6c: Small Group Training III

- ATTAINS for Managers – Great overview of the application and review/approval process. I look forward to getting a log-in to understand more. I am excited to see these efforts to complete the application and create this resource for our use and transparency to the public.
- ATTAINS for Managers: Very helpful information for someone inexperienced with ATTAINS.
- ATTAINS for Managers: very helpful details were presented to help TMDL program managers.
- ATTAINS for managers: Helpful overview.
- ATTAINS for managers = Excellent! Much better understanding of the expectations and process.
- ATTAINS 2, good session, revealed some needed upgrades.
- Stressor ID workshop was great. I learned a lot about different state's methods. Wish it was longer.
- Stressor ID – this was the session that was least engaging for me, was hoping to get into the weeds more. But discussion at end was very engaging.
- Stressor ID: Thanks!
- Bacteria – I think an entire day could be spent on bacteria like we did with nutrients this year. Interesting discussion.
- Bacteria: a bit frenzied. Only made the point that this topic needs flexibility.
- Bacteria – lots of questions left → maybe an ACWA webinar.
- Bacteria – Great interactive session. Appreciated Lars Wilcut joining this group from OST, to link WQS program with the practical application of these bacterial indicators with the problems of addressing impairments listings and TMDLs.

- Bacteria Forum: Liked this format (two facilitators and one note taker). Think this topic could also extend to the large group discussion – but would need to allocate more than one hour → would like to see future discussions include the implementation phase (e.g. 319 process).
- Bacteria – Jason and Rosaura were great co-facilitators. They used the open forum to identify issues/problems related to bacteria, and then broke those down into solutions, flexibilities, and potential action items. This was very effective.
- Fecal coliform/bacteria: engaged group discussion where most people seemed to learn something that may help them in their states.
- Bacteria – chaotic brainstorms. Maybe there could be a more focused discussion next year? Particularly interested in source tracking.
- Open Forum: Bacteria – Rosaura did great for co-facilitating.
- Bacteria – great discussion.
- Open discussion – bacteria – was not very relevant to my work (TMDL) – ended up being dominated by standards people. Maybe ID focus of session (TMDL or standards).
- 303(d) TAS: This could have been about 4 hours longer and would benefit from more tribal input.
- TAS 303(d) – Most helpful for me because it had information I could use immediately and present to tribal leaders for future TAS application.
- Protection – good examples, time was adequate.
- Protection: great examples. Interesting that states can/can't use 319 funds for protection. Also how different states track in database and IR.
- Protection: Helpful as a starting point for what protection plans may look like. Happy to start seeing some answers to the questions we've been asking.
- Protection – hand out helpful. Great speakers and examples. Still not clear of purpose of this. I'm sure it will come up as a topic for next year. Whole group feedback would be great.
- Protection: Very good.

Session #7: Regional Meetings and Additional Trainings

- Good format this year to allow for training for those who didn't meet with regions.
- Very good.
- Great opportunity to meet and discuss with everyone from the region.
- Prior regional meetings were more helpful. It would be helpful if the region before the program could determine the level of expertise in the program. That might drive if the session would be more lecture or dialogue.
- This was helpful, I learned different approaches by local states, and I was able to meet with R6 staff to assist and provide guidance.
- As a regional person, I really appreciate these sessions to be able to interact with our states. The discussions across states, sharing of info, and getting different perspectives from state reps are extremely valuable. Suggest longer time slot for this (~2hrs)
- Beneficial meeting, able to share ideas and projects with other states in the region.
- Good to make connections with others in our region because we are so far apart. I wish the regions could meet on a more frequent basis.
- Glad for the breakout and appreciated the region asking us for agenda items.

- Good discussions, probably need 2-3 sessions.
- Always good to have time with the states for us. This is a good opportunity to build relationships.
- A summary of earlier discussions, including nutrients (point source and NPS), water quality trading, and ATTAINS.
- Good conversation. Look forward to regional webinars; $ support from EPA possible 2nd grantees wish we ready to submit scope of work for projects as funding notice is communicated. Discussed WQ academy to include 303(d) segment.
- Regional calls (bimonthly, quarterly) came up; I like this idea.
- Liked having the opportunity to meet with the regional EPA/states.
- Helpful and great discussions – R4.
- A brief session for regional meeting report outs, like top 3 issues etc.
- Region 3: always good to talk with regional folks and state folks.
- One of the best parts of the conference. It's nice to discuss similar hot topics with similar states.
- Always appreciate these meetings and hope they continue to occur.
- Monitoring and modeling - The monitoring part was not super helpful. The modeling part was good. I enjoyed the overview; I think more training and support in modeling needs to be supported.
- Monitoring and modeling: very good discussion on modeling, provided a good set up for the modeling training to be held in the upcoming weeks.
- Monitoring and Modeling: More facilitated discussion NOT presentations.
- Monitoring/Modeling: we keep getting the question of how EPA can help states with modeling. This session helped communicate why they are asking and think more about how modeling can help support our TMDL development.
- Modeling: great session and discussion. One of the best I ever attended.
- Monitoring and modeling – great.
- Modeling/Monitoring – could have been more organized.
- Modeling was very informative but, at times, frustrating due to the logistics of providing training.

Informal Evening Sessions

- Measures – useful discussion.
- Measures – oh boy.
- Measures session was okay.
- Measures – next year, as Lean continues to expand, maybe good to dedicate some time to the whole group; especially rolling out EPA's national metrics.
- Measures – lively discussion.
- Measures: lots of interest in the new measures. More discussion will follow – glad to see state's comments will be considered. This could have been part of a larger group or part of the breakout sessions because it was hard to track all the comments, responses.
- Measures: It was great fun watching Dwane dodge bullets for an hour. But measures need to be addressed before WQ 35.
- Measures: dropping WQ 28? New WQ 35? I was surprised that such significant news was dropped at an evening session.

- Measures – good beginning for discussion – need follow up on baseline IDs.
- Navigating measures – hard to hear; topic would have been better shared in auditorium. States need to have an opportunity to provide input/feedback on these measures and baselines.
- Good stuff. I'm still not sure how "measures" are important to me at the state level.
- Measures: Seriously needed a sound system. Very hard to hear. Organization was poor. It was hard to follow where the discussion was going or what it was centered on.
- Measures – good, but I thought we were going to hear about the mission measures that EPA is facing.
- Training Needs: I think an open-ended survey would have been beneficial. We barely scratched the surface. This could be sent out as a follow up.
- Identify my Training and Resource Needs – There were some very good ideas on training topics, potential resources, etc. I'm very hopeful that many of these actually happen.
- Training/Needs: Love the idea of TMDL 101 both for staff to attend (like watershed academy) or have the self-paced option with webinars and such. And discussing need for training on communication – especially for technical people.
- Training and Resource Needs – It is clear that there needs to be/is much support for developing a TMDL academy/TMDL 101 training.
- Training and development – awesome. RoCo is the best.
- Identifying Training and Resource Needs: staff training on TMDL development, develop a site with training programs such as 101 modeling, communication (internal with programs and USEPA, external with stakeholders).
- Assistance and training from EPA. Great discussion!
- Great networking opportunities. Fun and was able to have interesting discussion with other people that do TMDL work. Well organized.
- I was a little tired for this.

Session #8: Communication

- The AZ presentation was great.
- Excellent. Great to see the online tools that some states have developed. PADEP was impressive in its use of the story map approach.
- Arizona has an awesome app! I see this as a way to change the culture of protection/awareness with younger generations. Love it!
- Loved the presentation, very inspirational.
- I presented, a lot of good discussion. Awesome to see what everyone is doing.
- The app discussion is really exciting. Please share links. I am blown away by PA. Maybe they could provide some HTML training in the future.
- The citizen science app was neat and could maybe be useful … The Pennsylvania IR was awesome! I also liked the story map. I'm wishing every state could implement something like this in the future.
- Excellent.
- Found the websites very helpful to use as a reference for future use in 303(d) and TMDL and for current monitoring practices.
- Great showcase of what the states have done (ADEQ's citizen monitoring, PA's impressive story map process).

- Very interesting, gained a lot of useful information.
- Story maps are great, but there needs to be an understanding that it's not inherently doable to turn a biologist into a coder.
- Super cool session. Makes me feel very old b/c this session really identifies a generational shift with how we think about sharing and engaging with the public.
- Very interesting and awesome methods demonstrated.
- Great session – all presentations were done very well and were inspirational. It seems like we could have used even more than 1.5 hours for communication.
- Making me brainstorm ways to investigate and use these tools in my state. Strong session!
- Good demo. Thank you for taking comments.
- PA rules. Look to see copy cats.
- It is really good to see how other states are using technology to communicate with stakeholders. It was mentioned that there may be grants available for APP development and will follow up on it.
- Great apps for effective communication. Set up WQ network group in order to be in the loop about technological resources, e.g., story maps.
- Lots of ideas from this session.
- Like that App! Dustin Shull – awesome communication approach w/ IR!
- PA – please share your code! This is where a forum for sharing would be great.
- Awesome – I will look for ways to copy PA and AZ. Very interesting use of technology.
- States are doing some really cool work. Excited to implement in our own state.
- Great – could be entire week.
- More app demos, maybe how to build an app session.
- Good information.
- Excellent! Great ideas were presented.
- AZ's app has tons of potential. I hope updates keep coming.
- Very good. Lots of good info here.
- Great ideas and information! Is it possible to get a poll of which states are exploring story maps and apps?

Session #9: How's My Waterway?

- Okay.
- The new app seems better than old one.
- Very useful for current initiatives and ways to present information and to see what others are doing or facing.
- Demo was helpful.
- I think this is wonderful. Looking forward to see how this continues to be developed. I could potentially see the benefit of using this for the development of watershed management plans (9 element) and for providing additional info on what has occurred in the watershed that may have contributed to a delisting for the WQ data layer – consider allowing the choice of data collected within the last five years, ten years, 20+ years, all years. I think this would be more meaningful and provide a more accurate representation of the information provided. Info from GRTS – it would be nice to know where 319

projects occurred and BMPs were implemented (along w/ any leveraging data?) and where 9-element plans are located and a status update? Link to plan?
- Very interesting web application, exciting as to how informative and user-friendly the app is. Encourage communication with states on contact and providing an understanding for the basis of summarized info. (e.g., if giving a percentage, what that value is based on so states can assess any guesses they receive).
- Great demos! Thank you for the copies of the presentations.
- The application will help us to see all data, IR reports, assessments, and much more. The application will be very helpful in evaluating potential issues before they become a big problem. Integration of 319 WBP is very helpful for the TMDL program.
- Good.
- Great improvements, great tool for the public.
- Looks awesome. Need to think about audience. Lots of great stories to tell. Is EPA the best one to tell it? EPA has all info and should tell it but will anyone listen? How does this lead to a change in public behavior and projects on the ground?
- Good information.
- Interesting.

Training Workshop Wrap-Up
- Okay.
- Great summary and wrap up for continued goal development.
- Nice touch from Dwane to provide "first" awards.
- Data management and summary wrap up – all good ideas/recommendations to focus on.
- Too long by last speaker. By the point she spoke, I was mentally done with the workshop.
- The awards were a nice touch. Haiku! Mood summaries.
- Great experience. Well run and organized. Friendly facilitators. Key outcomes always are; networking – connecting with colleagues, and inspiration – see what others are doing. Sometimes this may be useful for us. Sometimes it inspires other ideas.
- Excellent training, and thank you for organizing the workshop. It is great to see that the work you do will continue to protect our waters.
- Data management training! Key takeaways.
- Jim knocks it out of the park once again.
- Excellent. Thanks for a great conference. I learned a lot. I have a lot to share back home.

Other Comments or Suggestions
- ELI continues to do a great job.
- A lovely setting, but difficult to spend so much time running to and fro. Much prefer having lodging and central auditorium in same building.
- Please continue the great work you are doing. This is truly outstanding. Thank you!
- Please make the technical breakouts longer sessions. Example – modeling just takes longer to talk about than other less technical sessions. Please please please allow travel by the high speed Acela train in future years.
- Overall very well done. Great location.
- Please find a way to invite/fund more tribes. This was an extremely valuable experience for those of us who were able to attend.

- I thought the training/workshop was interesting and helpful. I thought the event was very well organized and allowed general topics and open discussion.
- In general I thought all the presentations were great, very relevant. The format worked well. I liked the targeted discussions in breakouts.
- You guys rock!! Thanks for another great workshop.
- Adam and crew … you guys rock! Thank you so much for your hard work. Very impressive.
- Great topics. Enjoyed time provided in each session for discussion and questions. Excellent facilitation!
- I was torn between several of the session 6a-c breakouts. I wish there was time for report-outs or summaries of these sessions as well. Topic suggestions for future years: chloride TMDLs/ Conductivity TMDLs for mining and non-mining areas; identifying/evaluating pollutants as stressors for biological impairment when the state has not adopted numeric criteria for multiple pollutants – especially metals and toxics. E.g. state has not adopted iron, aluminum criteria, PAH's criteria, but how can they still incorporate these in to a stressor ID?
- Would like more basic seminars too, maybe TMDL 101, R software 101, GIS use 101, etc.
- EPA came across as very arrogant and dominated all the sessions during this meeting. I'm disappointed. Maybe we should consider going back to the plans in the first ELI meeting that was state-centered with specific invited EPA staff.
- Kudos to ELI staff. Good topics, well designed program, well run.
- Thank you to workshop planners and amazing ELI folks who keep things running smoothly.
- Awesome job in putting this event together! Migrating breakout sessions together and sharing resources, challenges, solutions, and alternatives for projects. Network exchange.
- Better temperature regulation; cold rooms. Perhaps allow for a 1 hr break on the first full day to allow those travelling distances to catch a nap so more fully awake in afternoon sessions. Have more cold remedies available at the gift shop e.g. Zicam, Zinc Supplements, Vitamin C. Great facility and facilitators, thank you so much for extending this opportunity and thanks to the facilities staff.
- Might be useful to connect the networks and outreach activities of urban waters to the citizen science and communications topics as the synergies between these two programs could make more effective use of resources.
- Breakouts with more specific examples and details continue to be helpful. This is the most beneficial in my opinion. Please continue and reach out to states for examples.
- Massage therapy between sessions. Think every day should have a gathering of all folks to share daily info – helps keep connections going as well.
- Loved the breakout training. Do more of that.
- Insert a map of the EPA regions in the binder. The lack of cell service is a significant drawback of this location. I would like to have a future breakout session of 4b plans. The food was wonderful and the rooms were very comfortable. Glad to have the Thurs. afternoon field trips. It would be helpful if EPA folks would not refer to the short hand for metrics/measures (e.g. WQ-35). State reps mostly don't know what each # actually captures.

- Wonderful test session!
- Conference had a day about nutrients and all days discussed TMDLs. But, there wasn't any real discussion about how states write nutrient TMDLs. What models? What targets? How different for streams vs. lakes? What goes into a permit?

APPENDIX 4:
TRAINING WORKSHOP WEB PORTAL &
ELI'S *CWA 303(d) PROGRAM RESOURCE CENTER*

ELI continues to maintain and make publicly available a companion website for this training workshop and past training workshops. Materials and presentations from the 2018 training workshop are available at http://www.eli.org/freshwater-ocean/cwa-303d-training-workshops.

Other resources that are relevant to the mission and work of state and territorial CWA 303(d) programs and tribal water quality programs are available at the Institute's *CWA 303(d) Program Resource Center*, at http://www.eli.org/freshwater-ocean/state-tmdl-program-resource-center.