

CHAPTER 1: INTRODUCTION



UTAH DEPARTMENT of
ENVIRONMENTAL QUALITY
**WATER
QUALITY**

2016 Final Integrated Report

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CONTENTS

ABBREVIATIONS.....4

FIGURES.....5

 Introduction6

PURPOSE OF THE INTEGRATED REPORT7

 Clean Water Act 305(b) Reporting Requirements7

 Clean Water Act 303(d) Reporting Requirements8

 Integrated Report Classified Use Categories.....8

 Utah Division of Water Quality’s Tiered Monitoring Framework 13

 Assessment Summary 15

 Restoring Impaired Waters: Delistings..... 15

 Public Participation Process 16

CHANGES IN THE 2016 INTEGRATED REPORT 17

 New Data Sources..... 17

 Narrative Standard Assessment of Recreational Use Support..... 18

 Credible Data Review 18

 Changes to Assessment Units 18

 303(d) Vision..... 18

 Changes to Assessment Methods 18

LITERATURE CITED..... 20

ABBREVIATIONS

AU(s)	assessment unit(s)
CFR	Code of Federal Regulations
CWA	Clean Water Act
DWQ	Division of Water Quality
EPA	U.S. Environmental Protection Agency
HABs	harmful algal blooms
IR	Integrated report
MLID	monitoring location ID
NPS	nonpoint source
QA	quality assurance
TMDL(s)	total maximum daily load(s)
USGS	U.S. Geological Survey
WQs	water quality standards

FIGURES

Figure 1. EPA’s five-category system for classifying water quality standards for waterbodies..... 9

Figure 2. DWQ’s adaptive monitoring approach. 13

Figure 3. Summary of DWQ’s 6-year rotating basin monitoring schedule. 14

Figure 4. Number of AUs assessed and stream miles in each assessment category..... 15

Introduction

The Division of Water Quality (DWQ) is pleased to issue the final 2016 Integrated Report (IR) on the condition of Utah's rivers, streams, and lakes. Included with the report is a summary of public comment received during the Public Comment Period (June 10th – September 8th, 2016). The Division received approximately 30 comment letters with over 450 unique comments. To facilitate addressing a large number of comments regarding Harmful Algal Blooms in Utah Lake and Farmington Bay, a *Joint Comment Responses* document is provided in Appendix A of the *2016 Final Integrated Report Response to Public Comments* table provided with this report.

PURPOSE OF THE INTEGRATED REPORT

The Utah Division of Water Quality (DWQ) is responsible for a variety of programs that monitor, assess, and protect the surface and ground waters of the state. Partnering with a range of public and private entities, DWQ combines its data collection efforts with the data collected by identified stakeholders to characterize the surface water quality of the state. This report is the result of that collaborative effort. The 2016 Integrated Report (IR) contains updates from previous reports (e.g., the 2012 - 2014 IR) and a comprehensive survey of the water quality of surface waters in the state from 2008 to 2014.

What makes up an IR?

The U.S. Environmental Protection Agency (EPA) asks states to integrate four components into their IRs every 2 years:

1. A water quality inventory report, Chapters 3 and 4 of this document
2. An impaired waterbody list, incorporated into Chapters 3 and 4 this document
3. An electronic copy of the 305(b), e.g., the Assessment Database
4. A copy of the state's National Hydrology Dataset

Information on the reporting requirements from EPA and the different components of the IR are also discussed in this chapter. For details on the assessment methods used for this IR, please refer to Chapter 2 Assessment Methods.

Clean Water Act 305(b) Reporting Requirements

The Federal Water Pollution Control Act—e.g., the Clean Water Act (CWA), Section 305(b)—requires states to monitor the water quality of their surface and ground waters and report on the status of these waters in a biennial report that is submitted to EPA.



As recommended by EPA in their IR Guidance Document (EPA, 2005), the following information must be included in the 305(b) report:

- A list of water quality-limited (impaired) waters still requiring total maximum daily loads (TMDLs), pollutants causing the impairment, and priority ranking for TMDL development
- A description of the methods used to develop the list

Final 2016 IR: version 2.1



- A description of the data and information used to identify waters, including a description of the existing and readily available data and information used
- A rationale for any decision to not use any existing and readily available data and information
- Any other reasonable information requested by EPA, such as demonstrating good cause for not including a water or waters on the list

Clean Water Act 303(d) Reporting Requirements

In addition to the 305(b) report, Section 303(d) of the CWA requires states to submit a list biennially to EPA that identifies the waterbodies in that state that do not meet the state's WQSs. This list is reviewed by EPA and helps guide the state's TMDL development process to correct the specified impairment.

- As recommended by EPA in their IR Guidance Document (EPA, 2005), the following information must be included in the 303(d) report:
- A list of water quality–limited (impaired and threatened) waters still requiring TMDL(s), pollutants causing the impairment, and priority ranking for TMDL development
- A description of the methods used to develop the list
- A description of the data and information used to identify waters, including a description of the existing and readily available data and information used
- A rationale for any decision to not use any existing and readily available data and information
- Any other reasonable information requested by EPA, such as demonstrating good cause for not including a water or waters on the list

Cleaning up a State's Impaired Waters:

For waterbodies that are listed as impaired, the CWA requires a TMDL to be developed. TMDLs document the nature of the water quality impairment, determine the maximum amount of a pollutant discharge (while still meeting state standards), and identify acceptable loads from the pollutant source. EPA also recognizes alternative mechanisms that can be used to restore an impaired water including watershed based implementation plans.

Integrated Report Classified Use Categories

Utah refers to *designated uses* as the basic unit for reporting water quality and uses EPA-recommended reporting categories to classify segments of waterbodies as meeting or not meeting applicable WQS. These categories are presented in Figure 1 and are described in further detail following the figure. The specific methods used by DWQ to make any of the below conclusions are documented in detail in Chapter 2 Assessment Methods.

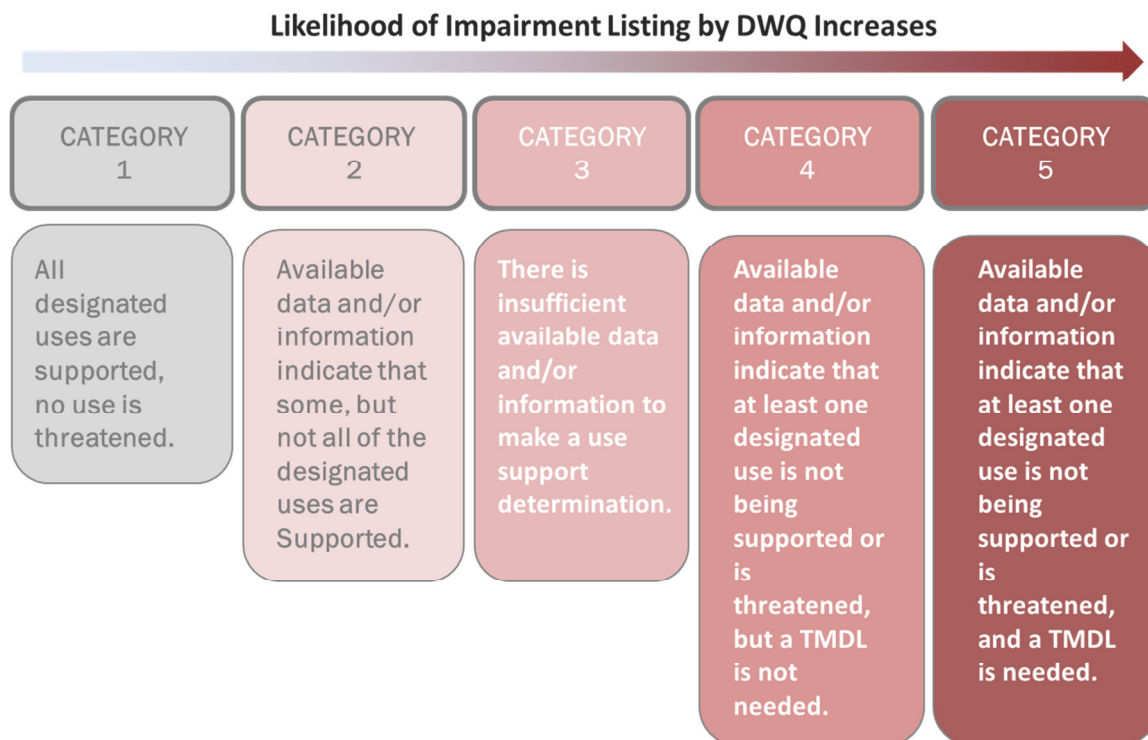


Figure 1. EPA's five-category system for classifying water quality standards for waterbodies.

Category 1: All designated uses are attained.

Assessment units (AUs) are reported as Category 1 if all beneficial uses have been assessed against one more numeric criterion **and** each use is found to be fully supporting all uses.

Category 2: Some of the designated uses are attained, but there are insufficient data to determine beneficial use support for the remaining designated uses.

AUs are reported as Category 2 if some but not all designated uses have been evaluated, yet those uses that have been assessed are found to be supporting designated uses.

Category 3: There are insufficient data to make a determination, or lakes and reservoirs show indication of impairment for a single monitoring cycle.

For each designated use, AUs are reported as Category 3 if some data and information are available to evaluate one or more of an AU's designated uses, yet available data are insufficient to make a conclusive assessment determination. Inconclusive decisions result from datasets that fail to meet data quality objectives that DWQ has established for making IR assessment decisions. Examples of situations where AUs are reported as Category 3 include the following: datasets with an insufficient number of samples available for analysis, situations where there were contradictory conclusions from multiple data sources, or situations where quality assurance/quality control procedures were improper or poorly documented.

By reporting an AU as Category 3, versus simply reporting the AU as not assessed, DWQ is making a commitment to prioritize future monitoring to make a final assessment determination. In part due to this intrinsic commitment to prioritize monitoring, DWQ uses six Category 3 subcategories for planning purposes, which are defined as follows at the monitoring location identification (MLID):

- **Category 3A:** MLIDs are listed in Category 3A if there are insufficient data and information to make an assessment and if the data include violations of water quality criteria. Information on Category 3A waters will be used to guide future monitoring and evaluations.
- **Category 3B:** Lakes and reservoirs that have been assessed as not supporting a beneficial use for one monitoring cycle are included in Category 3B. If a lake or reservoir is assessed as impaired for two consecutive monitoring cycles, it is listed on the 303(d) list.
- **Category 3C:** This category is currently used for Great Salt Lake (Designated Use Class 5). Assessment of this ecosystem with traditional approaches is complicated by the current lack of numeric criteria, with the exception of a selenium standard applicable to bird eggs. Also, the lake is naturally hypersaline, so traditional assessment methods are not appropriate. DWQ is working toward developing both numeric criteria and assessment methods for this ecosystem. In the interim, the IR documents the progress that was made in the most recent 2-year reporting cycle.
- **Category 3D:** Further investigations are required. For example, MLIDs with potential impairments for nutrients and biochemical oxygen demand were placed in Category 3D until such time that numeric nutrient criteria are developed.

- **Category 3E:** MLIDs are listed in Category 3E if there are insufficient data and information to make an assessment and if the data do not include violations of water quality criteria.
- **Category 3F:** MLIDs are listed in Category 3F if an assessment was not performed due to missing use information for the AU. Category 3F waters will be assigned designated uses for the 2016 IR assessment.

Category 4: Impaired for one or more designated uses, but does not require development of a TMDL. For each designated use, AUs are reported as Category 4 if water quality remains insufficient to support the designated use, yet a TMDL is not required. EPA and DWQ use three Category 4 subcategories, which are defined as follows:

- **Category 4A: TMDL has been completed for any pollutant:** AUs are listed in this subcategory when any TMDL(s) has been developed and approved by EPA, that when implemented, is expected to result in full support of the water quality standards or support the designated uses. Where more than one pollutant is associated with the impairment of an AU, the AU and the parameters that have an approved TMDL are listed in this category. If it has other pollutants that need a TMDL, it will be listed in Category 5 until all TMDLs are complete.



(North Fork, Chalk Creek)

- **Category 4B: Other pollution control requirements are reasonably expected to result in attainment of the water quality standard in the near future:** Consistent with the regulation under 40 Code of Federal Regulations 130.7(b)(1) (ii) and (iii), AUs are listed in this subcategory where other pollution control requirements (e.g., best management practices required by local, state, or federal authority) are stringent enough to meet any water quality standard or support any beneficial use applicable to such waters.
- **Category 4C: The impairment is not caused by a pollutant:** AUs are listed in this subcategory if the impairment is not caused by a pollutant (e.g., habitat alteration, hydromodification).

Interpreting a WQS:

When deciding if a segment of a river or stream or a lake or reservoir should be put into a Category 1, 2, 3, 4, or 5, DWQ must consider the following factors: WQSs applied to that segment, the designated use assigned to the segment, and numeric criteria applicable to the designated use.

These factors help answer the following: *What do the monitoring data and other information tell us about whether or not this river/stream or lake is meeting WQSs? For more information on how Utah interprets a WQS, please refer to Chapter 2 Utah's 2016 303(d) Assessment Methods*

Category 5: The concentration of a pollutant—or several pollutants—exceeds numeric water quality criteria, or quantitative biological assessments indicate that the biological designated uses are not supported (narrative water quality standards are violated).

Waters reported as Category 5 are impaired, which means that they are not meeting their designated uses. The list of Category 5 waters is sometimes called the “303(d) list” in reference to this section of the CWA, which among other things, requires states to identify impaired waters. There are several sources of data and information that are used when making impairment decisions. First, chemical assessments evaluate designated use support for an AU by comparing pollutant concentrations against numeric criteria that have been established to protect the use. A designated use of an AU is reported as Category 5 if any of the following apply:

- The concentration of any pollutant exceeds—as defined by the methods described in this document—a numeric water quality criterion.
- Quantitative biological assessment results for streams and rivers are statistically different than the reference site conditions.
- Weight of evidence assessments for lakes and reservoirs indicate that designated uses are not being supported.

Category 5- Alt

The 303(d) program vision promotes the identification of alternative approaches to TMDL development for impaired waters where these approaches would result in a more rapid attainment of water quality standards. The alternatives include “4C candidates,” waterbodies impaired by causes that cannot be addressed by a TMDL such as hydrologic and habitat modification; waterbodies impaired by total dissolved solids that fall within the auspices of the Colorado River Basin Salinity Control Program; impaired waters that have existing TMDLs in place for related parameters and are therefore already being addressed; waterbody impairments that are the result of natural uncontrollable pollutant sources and therefore require development of site-specific standards; and

impaired waters that have taken a straight-to-implementation approach through ongoing watershed implementation activities.

Utah Division of Water Quality's Tiered Monitoring Framework

To integrate the various programmatic data needs within the division, DWQ employs an adaptive approach to its annual monitoring plans, which allows for an efficient and adaptive monitoring and management program.

This tiered adaptive monitoring and management framework for DWQ allows the division to develop robust datasets in 1 year that inform the data collection and assessment decision making in subsequent years (Figure 2). In this adaptive program, monitoring continues to iteratively improve the knowledge base of management, so decision making is based on the best science available. As more information becomes available, the scientific uncertainty about the ecosystem is reduced, and initial actions and management decisions are revisited and refined (see Figure 2). During the evaluation process at DWQ, the information that is gathered provides staff with critical input on how to adjust to the next round of monitoring in the three types of monitoring and assessment efforts described below.

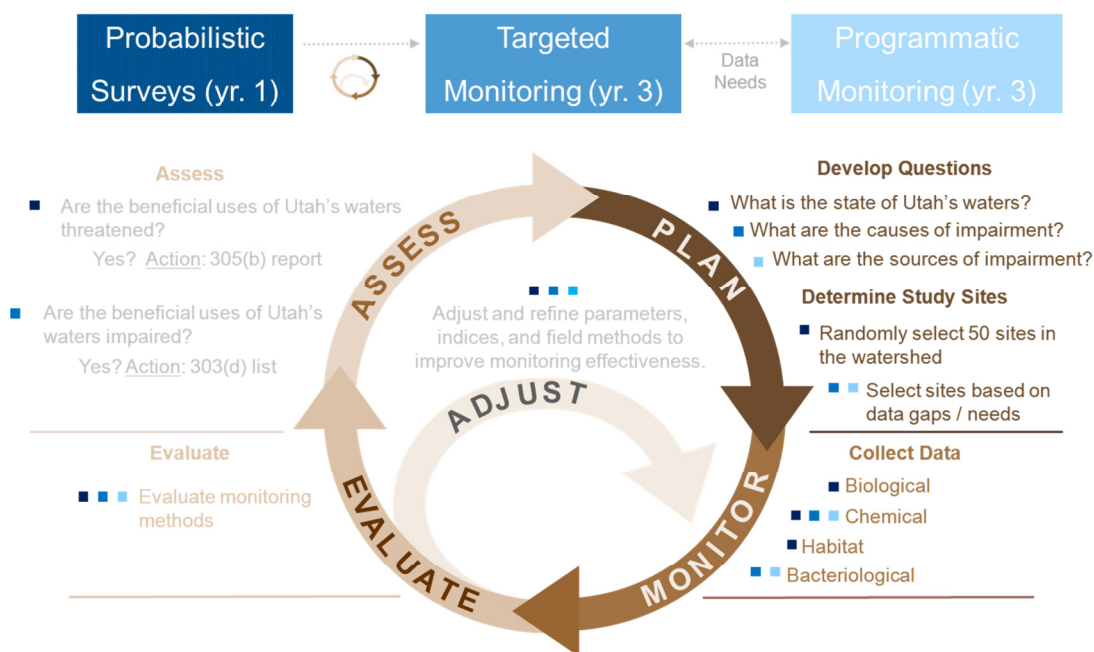


Figure 2. DWQ's adaptive monitoring approach.

- **Probabilistic Surveys:** Designed to meet the reporting requirements of the 305(b), probabilistic surveys assess all waters of the state by randomly selecting and monitoring different waterbodies within one of the seven major watersheds in Utah (see Figure 3 for the rotating basin schedule). The information collected from the environmental surveys is used to 1) assess the attainment of various designated uses (e.g., aquatic life and contact recreational uses) and 2) better understand the significant causes of pollution throughout Utah.
- **Targeted Monitoring:** Environmental surveys within this monitoring effort are performed annually to develop the 303(d) impairment status reports. Using the water quality concerns

that are highlighted during probabilistic surveys as a guide, site-specific monitoring plans during targeted monitoring efforts are used to assess the biological and chemical conditions of a specific stream (see Figure 2). These more intensive surveys allow DWQ to more fully understand the scope and extent of water quality problems in the state.

- **Programmatic Monitoring:** Surveys within this monitoring effort are performed annually, alongside targeted monitoring efforts. This is done to maximize division resources in the targeted watershed. During these programmatic monitoring efforts, the data needs of the division are met; these needs include TMDL development, evaluation of nonpoint source (NPS) project effectiveness, development or refinement of numeric water quality criteria, and a variety of compliance monitoring programs.

To implement the monitoring and assessment efforts described above, DWQ developed a 6-year rotating basin monitoring schedule to ensure that 1) staff has sufficient data to determine if a waterbody is impaired and 2) DWQ can work toward its goal of assessing all Wadeable Rivers and streams and all lakes and reservoirs in the state.

By focusing the division's monitoring efforts on a couple of river basins each year (versus the whole state), DWQ is able to concentrate its monitoring efforts on a smaller geographical area and collect more water quality samples from numerous waterbodies within a watershed management unit during a single sampling season. Using this rotating sampling structure allows DWQ staff to make more accurate assessments and informed 303(d) listing decisions by having a more robust dataset.

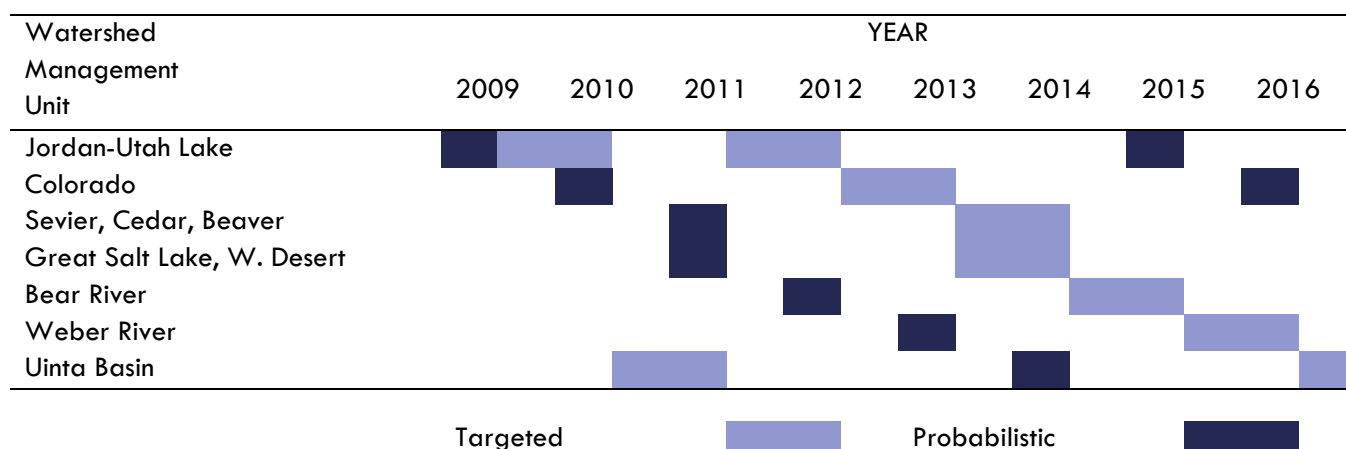


Figure 3. Summary of DWQ's 6-year rotating basin monitoring schedule.

Integrating the proposed tiered monitoring framework into current division and programmatic needs and constraints requires targeted and programmatic monitoring efforts to follow the probabilistic surveys (1–2 years later) and focus on ongoing TMDL needs around the state until the initial round of probabilistic surveys is assessed.

Assessment Summary

Figure 4 summarizes the results of the 2016 303(d) report indicating the number of AUs in each of the five categories and total stream miles and lake acreage for each.

Category	No. of Stream AUs	Stream miles	No. Lake of AUs	Lake Acres
1 (Supporting)	41 (6%)	667 (4%)	0 (0%)	0 (0%)
2 (No evidence of Impairment)	123 (16%)	2,706 (17%)	58 (41%)	57,369 (4%)
3 (Insufficient Data)	335 (44%)	4,991 (32%)	22 (15%)	1,121,274 (76%)
4 (Pollution Control in Place)	26 (3%)	742 (5%)	11 (8%)	22,324 (2%)
5 (Not Supporting)	235 (31%)	6,582 (42%)	51 (36%)	266,256 (18%)

CATEGORY 1 Supporting	CATEGORY 2 No Evidence of Impairment	CATEGORY 3 Insufficient Data	CATEGORY 4 Pollution Control in Place	CATEGORY 5 Not Supporting
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Figure 4. Number of AUs assessed and stream miles in each assessment category. Category 3 lakes include four Great Salt Lake AUs comprising 1,090,361 acres.

Restoring Impaired Waters: Delistings

When assessment units are removed from a 303(d) listing, EPA strongly encourages states to document why they are moved from a Category 5, 4a, 4b, and 4c to other categories. When a delisting occurs, Utah provides in the 305(b) report a list of the newly delisted site(s) and the following justification(s):

- Utah determines that the water quality standards are being met.
- There were flaws in the original listing.
- Other point source or nonpoint source controls are expected to meet water quality standards
- Impairment was due to a nonpollutant.
- EPA approves the TMDL.
- The waterbody is not in the state's jurisdiction.

Public Participation Process

As part of DWQ's ongoing commitment to work with the public to safeguard human health and protect and enhance Utah's waters, DWQ engages its stakeholders from the start. Communities and others affected by the decisions of the 305(b) and 303(d) are asked to participate in the IR process through two opportunities before DWQ submits the IR to EPA. These two opportunities are described below:

1. Publicly Submitted Data Notification

Each IR cycle, DWQ makes a formal public notification—through newspaper ads, website postings, and email list servers—requesting data and information that can be used to inform designated use assessments. Whenever possible, the aim of DWQ is to obtain all data and information with sufficient time to compile the information by April of odd years. This allows DWQ sufficient time to obtain clarification where necessary, ensuring that outside sources of information are used to the greatest extent possible for IR assessments. Following each public notice, interested stakeholders have a minimum of 30 days to submit water quality information to DWQ.

2. Public Comment on the revisions to the Assessment Methods

In preparation for the 2016 IR, DWQ implemented a process of issuing the Assessment Methods for public comment prior to performing the analysis for the IR. DWQ established a comment period for the methods in March of 2015 and received a number of comments from stakeholders. Since issuing the draft methods, DWQ has integrated those comments and made a number of refinements and changes to improve the assessment process. A complete summary of the changes can be found in the introduction of Chapter 2.

3. Public Comment on 305(b) and 303(d) Decisions

At the end of the 305(b) and 303(d) report writing process, DWQ again makes a formal public notification, requesting comments that can be used for considering the placement of AUs in the five categories. Upon receiving comments from the public, DWQ either revises the IR (based on the public's feedback) or addresses the comments in a summary. These comments or comment summaries are then submitted to EPA along with the 305(b) and 303(d) listing decisions.

CHANGES IN THE 2016 INTEGRATED REPORT

Since our last report, DWQ has improved our methods of evaluating and reporting on the status of water quality and included a number of additional data sources to enhance the coverage of our assessments statewide. This section summarizes the additions and changes to DWQ's assessments since the 2014 IR.

New Data Sources

Federal regulations (40 CFR 130.7(b)(5)) require DWQ to examine all existing and readily available data when making assessment decisions, which includes consideration of data collected by DWQ and others. DWQ has long included data collected by partnering agencies such as the US Forest Service, Bureau of Land Management, and a variety of local and state agencies. These partnerships have been developed over the years as part of DWQ's Cooperative Monitoring Program, in which participants collect samples in the field in return for an allocation of state lab resources as a way of leveraging additional data collection to mutually support program needs. In the 2016 IR assessment, in addition to our cooperator data, DWQ included data collected in rivers and streams as part of the compliance monitoring for the Division of Oil, Gas, and Mining as well as data collected by a citizen group.

While DWQ analyzed these same data sources in its 2016 assessments, several other sources of data were also included. For the first time, DWQ evaluated applicable data collected between 2008-2014 by the US Geological Survey (USGS) and compiled results from monitoring locations where data indicated impairments for inclusion in the draft 303(d) list. For each monitoring location, DWQ compiled and screened all available water quality data (as outlined in 303(d) methods). For the 2016 IR, observations from the USGS dataset that had numeric values exceeding the Utah's water quality standard for each beneficial use were used to either conclude impairment or prioritize the AU for follow-up monitoring to obtain the data necessary to make conclusive assessment decisions. Due to time and resource constraints, USGS data was only used for Category 5 (impaired) determinations. In future IR cycles, DWQ plans to fully integrate these data into its assessments for determining all applicable assessment categories.

DWQ performed an evaluation of data related to harmful algal blooms that could pose a health risk to recreational users in Farmington Bay (see Chapter 6). Extensive datasets were submitted to DWQ by two stakeholders, the Central Davis Sewer District and Utah State University, and were aggregated for the purpose of this evaluation. The data were compared to indicators of human health risks for harmful algal blooms (HABs) to provide context to the public about potential risks associated with recreating in Farmington Bay. HABs can adversely affect human health during recreational activities in and on the water. DWQ is obligated to analyze these data and report findings to the public. In Chapter 6, DWQ discusses the recreational uses of Farmington Bay, HAB indicators, and the results of the data evaluation.

In addition, DWQ obtained a significant dataset from the Jordan River/Farmington Bay Water Quality Council, which DWQ used to evaluate methods for high frequency data assessments. These include a high frequency dataset of dissolved oxygen from several sites on the Jordan River that were used in a pilot evaluation of proposed assessment methods for high frequency dissolved oxygen data (see Chapter 7).

DWQ also assessed a rich dataset including data from DWQ and EPA that was collected in the San Juan River following the Gold King Mine release in Colorado on August 5, 2015. Data collected by EPA in Fall 2015, during monsoonal storm events, caused DWQ to list two segments of the San Juan River as impaired for several metals.

Narrative Standard Assessment of Recreational Use Support

The occurrence of harmful algal blooms (HABs) is a growing water quality concern across the nation. In Utah, HABs usually consist of cyanobacteria (also known as blue green algae) that can produce dangerous toxins and pose a risk to human health through direct contact, inhalation or ingestion. HABs have occurred in some Utah lakes and reservoirs. In 2015, DWQ developed assessment methods that included a new HAB assessment method for recreational uses (Chapter 2) which reflects the potential for “undesirable human health effects” identified in the Narrative Standard and uses a cyanobacteria cell count as the indicator of HAB related impairments for recreational and drinking water uses. A full evaluation of the assessment is contained in Chapter 5.

Credible Data Review

In 2015 as part of its “Call for Data” for the 2016 IR, DWQ implemented a credible data review process. Data quality grades were assigned by the Monitoring and Reporting Section QA Officer using best professional judgment and criteria listed in the Credible Data Quality Matrix for each data type. Data quality grades were assigned generally for the dataset as a whole, acknowledging that individual results are reviewed and may be flagged or rejected during pre-assessment QC checks. For DWQ and DWQ’s Cooperators, and for Western Watersheds, an additional column titled “Areas for Improvement” is populated for the use of the Monitoring and Reporting Section Manager. This column includes suggestions for ways to achieve higher data quality for future IR cycles.

Changes to Assessment Units

With the detailed assessment results provided by the 2012-14 IR, DWQ has performed an evaluation of assessment units that could be redefined to better reflect and isolate the subwatersheds that are impaired from areas meeting water quality standards. With this flexibility, DWQ hopes to improve tracking and dissemination of water quality information and assessment results and highlight areas of focus for developing TMDLs, wasteloads, and other pollution prevention strategies. A summary of the proposed Assessment Unit redefinitions is provided with this report.

303(d) Vision

In 2016, DWQ has adopted a new framework for implementing the Clean Water Act (CWA) Section 303(d) Program. The new Program Vision enhances overall efficiency of the CWA 303(d) Program, encourages focusing on priority waters, and provides States flexibility in using tools in addition to TMDLs to restore and protect water quality. With the recognition that there is not a “one size fits all” approach to restoring and protecting water resources, Utah has developed tailored strategies to implement its CWA 303(d) Program responsibilities in the context of our water quality goals.

Changes to Assessment Methods

In preparation for the 2016 IR, DWQ implemented a process of issuing the Assessment Methods for public comment prior to performing the analysis for the IR. DWQ established a comment period for

the methods in March 2015 and received a number of comments from stakeholders. Since issuing the draft methods, DWQ has integrated those comments and made a number of refinements and changes to improve the assessment process. A complete summary of the changes can be found in the introduction of Chapter 2.

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