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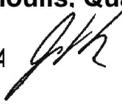
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MEMORANDUM

TO: Lynette Guevara, Assessment Coordinator

COPY: James Hogan, Surface Water Quality Bureau Chief
Jeff Scarano, Monitoring, Assessment and Standards Program Manager

FROM: Jodey Kougioulis, Quality Assurance Officer

DATE: May 23, 2014 

SUBJECT: 2013 External Data Quality Assurance Assessment

Introduction

From March 20, 2013 until April 19, 2013, the New Mexico Surface Water Quality Bureau (SWQB) solicited outside organizations to submit chemical, physical, biological, habitat and bacteriological (i.e., *E. coli*) data for any streams, rivers, lakes, and reservoirs in the state acquired since May 1, 2008, that could then be considered subject to New Mexico's water quality standards published in 20.6.4 NMAC and incorporated into the development of the Integrated List.

The SWQB Quality Assurance Officer (QA Officer) assessed five datasets from outside sources. Additionally, SWQB acquired data from the public access data portal Intellus New Mexico which contains data generated by Los Alamos National Laboratory (LANL) and the New Mexico Environment Department of Energy Oversight Bureau (DOE OB). The 2013 Water Quality Data Submittal Guidance and Checklist (<http://www.nmenv.state.nm.us/swqb/DataSubmittals/>) were used in combination with all relevant SWQB Quality Assurance/Quality Control (QA/QC) requirements, namely the 2013 SWQB Quality Assurance Project Plan (QAPP) (<http://www.nmenv.state.nm.us/swqb/QAPP/>) and associated Standard Operating Procedures (SOPs) (<http://www.nmenv.state.nm.us/swqb/SOP/>), to assess the quality of the submitted and acquired data and determine its suitability for inclusion into the development of the Integrated List.

Specifically, the submitted documentation associated with each dataset was reviewed to determine: (1) if there was documentation of QA/QC procedures that, at a minimum, meet the QA/QC requirements described in the SWQB's most recent QAPP; and (2) if there was reasonable evidence or assurance that these procedures were followed. If these minimum requirements were met, the submitted data may be incorporated in the dataset used to make attainment decisions.

Summary

Data were received from: (1) Sentinels-Rios de Taos/Amigos Bravos; (2) New Mexico State University/United States Geological Survey (USGS); (3) Village of Ruidoso; (4) Taos Pueblo; and (5) Elephant Butte Irrigation District (EBID)/International Boundary and Water Commission (IBWC) in cooperation with the SWQB Las Cruces Field Office. All documentation associated with each dataset from each individual submission was assessed for methods of collection and preservation, documented

verification and validation (V&V) procedures, documented holding times, container requirements, sample site criteria, analysis methodology, documented use of credentialed laboratories and the adequacy and relevance of all associated field sampling plans, sampling and analysis plans, QAPPs, and SOPs. Unless otherwise specifically noted, all methods, contracted labs, equipment, collection procedures, and preservation and analysis procedures were acceptable and met the minimum SWQB submitted data requirements. Data that did not meet these criteria are described below in detail. The quality assessment of all submitted and acquired data follows:

Sentinels-Rios de Taos/Amigos Bravos

Data Submitted: *E. coli*, Total Dissolved Solids (TDS), Nitrate, Biological Oxygen Demand (BOD), Temperature (T), pH, Specific Conductance (SC), Ammonia, and Dissolved Oxygen (DO).

Sentinels-Rios de Taos, with support from Amigos Bravos, submitted data and associated data documentation including sampling sites, methods, equipment, and collection procedures which are described in the 2011 Taos Water Quality Sampling Report and QAPP. Upon further request, Eric Patterson (Sentinels-Rio de Taos) provided details regarding specific sampling containers used and required hold times and preservations. EPA-certified Sangre de Cristo lab in Alamosa CO was used for analysis and the methods and credentials of the lab met the SWQB requirements, namely the documented use of EPA Methods or Standard Methods for the Examination of Water and Wastewater. Listed equipment and parameter detection limit accuracy also met the data submittal requirement criteria. Upon further conversation with Eric Patterson, there are reasonable assurances that the QAPP and all related collection and analysis procedures were followed and therefore these data meet the minimum QA requirements for outside data submission and may be used for standard attainment and Integrated List development.

New Mexico State University/United States Geological Survey (USGS)

Data Submitted: Stream Water Temperature

Water temperature data collected in New Mexico for a Rio Grande Cutthroat Trout joint study between New Mexico State University and the USGS was submitted for consideration for incorporation into the development of the Integrated List. For this particular project, Onset Computer Corporation HOBO U22 Pro v2 Water Temperature Data Loggers were used to measure water temperature. Supporting documentation included calibration procedures, data logger operating range and accuracy, launch preparation descriptions, pre-field and field deployment procedures, site selection criteria and sample location and data quality analysis procedures including V & V procedures with established qualifying criteria. All documented procedures were equivalent to SWQB procedures for water temperature measurements. USGS Open-File Report 2013-1051 Zeigler, M.P., Todd, A.S., and Caldwell, C.A., 2013 *Water temperature and baseflow discharge of streams throughout the range of Rio Grande cutthroat trout in Colorado and New Mexico* describes the purpose and scope of the study, data collection methods, quality control, and geographic area. Accompanied Excel spreadsheets include locational metadata, deployment and retrieval dates, raw data, and error checked data with corresponding graphs. Upon further conversation with Matt Zeigler (author of Open-File Report and primary data collector) there was reasonable evidence that all identified procedures were adhered to and these data meet SWQB's minimum QA requirements for submitted data and can be used in assessments.

Village of Ruidoso

Data Submitted: Nitrite/Nitrate, TKN, and Ammonia as N, Ortho-Phosphorus, TP, Periphyton (Chlorophyll a), Benthic Macroinvertebrate, and water quality parameter measurements (T, DO, pH, SC)

The Village of Ruidoso submitted water quality data collected from May 2009 and December 2012. Parametrix was contracted by the Village of Ruidoso to perform water quality measurements and data collection with subcontractors EcoAnalysts Inc. and University of Idaho Analytical Laboratory Services providing the analysis for benthic macroinvertebrates, periphyton, and nutrient sample analysis. A QAPP (Rio Ruidoso Monitoring Program Quality Assurance Project Plan) was provided, which clearly outlined sample design, collection procedures, handling, custody, preservation and hold time, sample frequency,

sample equipment, laboratory QA and analysis methodology, and V&V procedures. Data were received in Excel spreadsheet format, which included, where relevant, detection limits, sample dates, and analytical methods. Additionally requested chain of custody documentation and laboratory certified results provided sample preservation and sample analysis dates.

The nutrient data (Nitrate, Nitrate, Total Phosphorus, TKN, Ammonia as N, and Ortho-Phosphorus) collected by Parametrix and analyzed by the University of Idaho Analytical Laboratory Services were determined to not meet the requirements for use in assessments. The collection and preservation of these samples did not follow the provided QAPP nor the methods identified for analysis namely EPA Methods 350.1, 351.2, 353.2, and 365.2. Specifically, samples were collected in the field but not preserved at time of collection with acid (H_2SO_4). This appears to be contrary to what was specified in the QAPP and also what is prescribed in the EPA methods. Additionally, samples were typically frozen for shipment to the lab, which then preserved the samples either upon thawing or sometime prior to analysis. The combination of a lack of field H_2SO_4 preservation, maintaining sample temperature between 2 and 6 degrees Celcius, and an indeterminate amount of time between collection and preservation prevent these data from meeting submitted water quality data requirements and are therefore not equal or comparable to the SWQB QAPP and SOP criteria. Email and phone correspondence with Parametrix Principle Investigator Jim Good and University of Idaho Analytical Sciences Laboratory Manager Steve McGeehan further confirmed the previously described collection and preservation procedures. These data should not be used for water quality standards attainment purposes or assessment.

In-stream water quality physical parameter measurements (T, DO, pH, SC) were also collected under the submitted QAPP using equivalent or similar equipment, siting criteria and quality assurance measures. Specifically, sonde data was evaluated with regards to anomalous signatures of probe bio fouling, equipment exposure and burial, and all raw data was also submitted with each QA corrected file. These data can be used for assessment purposes.

Periphyton (Chlorophyll a) collection procedures outlined in the QAPP are comparable to the collection of periphyton under the SWQB QAPP. The analysis method (Modified Winterman/DeMotts and EPA 446) also appears to be comparable to SWQB's Chlorophyll a analysis procedures. Upon further correspondence with Gary Lester, EcoAnalysts Laboratory Manager, the quality assurance measures identified within the QAPP also met or exceeded SWQB's minimum requirements. There are reasonable assurances that these methods and protocols were appropriately followed. Thus, these Chlorophyll a data met the requirements necessary to be used for assessment purposes.

Benthic Macroinvertebrate sample and analysis procedures were determined to be equivalent to SWQB QA standards and are therefore considered acceptable for use in the turbidity protocol.

Taos Pueblo

Data Submitted: Stream Temperature, DO, SC, pH, TKN, Ammonia, Phosphorous, Nitrate/Nitrite, and *E. coli*.

Data submitted for consideration was collected under the Taos Surface Water Quality Monitoring QAPP prepared by Taos Pueblo Environmental Office and provided during data submission. Included in addition to the QAPP were sampling station coordinates (Lat/Long) and site names, detailed map of locations, photo documentation of sediment, and three Excel spreadsheets with both chemical and physical parameters for each site. The EPA-certified Sangre de Cristo lab in Alamosa, Colorado was used for analysis and the methods and credentials of the lab met the SWQB requirements, namely the documented use of EPA Methods or Standard Methods for the Examination of Water and Wastewater. Included within the nutrient sample results were detection limits, sample dates, station I.D., and the ability to calculate hold times. The nutrient and *E. coli* data collection procedures and analysis were determined to be comparable to those described in the SWQB QAPP and therefore these data are acceptable for assessment purposes.

The in-stream water quality physical parameter measurements (T, SC, pH, DO) lacked sufficient documentation of quality assurance criteria to be comparable to the SWQB QAPP. Lack of or insufficiently described V&V procedures, calibration procedures, and equipment specifications reduce the

ultimate usefulness of this data. There were some contradictions within the QAPP and the described calibration procedures that were highlighted through conversation with Taos Pueblo Environmental Office staff, specifically with regards to calibration frequency and recalibration criteria. While the competency and qualification of the staff is not in question, the documented and practiced procedures are not consistently stated. Additionally, there were no documented procedures with regards to the assessment of long term deployment datasets or any description of quality assurance criteria associated with data sondes for the recognition of low battery charge, exposure, burial, etc. The documented or expressed QC procedures for physical parameter data are not comparable to SWQB QAPP requirements. These data have not satisfied the SWQB criteria for use in assessment purposes.

Elephant Butte Irrigation District, International Boundary & Water Commission and SWQB

Data Submitted: *E. coli*

The Elephant Butte Irrigation District (EBID), with assistance from NM SWQB Las Cruces staff, collected *E. coli* data from the Lower Rio Grande between 2008 and 2011. These data were collected in accordance with the 2007 NMED/SWQB Standard Operation Procedures (SOPs). Additional *E. coli* data were submitted with these data that was collected under the *Rio Grande Basin Monitoring Program QAPP prepared by the International Boundary and Water Commission Water Quality Planning Division*. These data include *E. coli* results for two coincident locations (Courchesne and Above East Drain) within the EBID study between 2001 and 2012. The referenced QAPP, collection and analysis procedures, and consultation with Chris Canavan (SWQB Las Cruces) indicates there was reasonable evidence that these procedures were executed and therefore these data are considered acceptable for assessment purposes.

Intellus New Mexico (Intellus) Public Access Environmental Monitoring Data

Data Acquired: Polychlorinated phenyls (PCBs), Metals, and Radionuclides

SWQB acquired surface water quality data from the public access data portal Intellus New Mexico (http://www.intellusnmdata.com/reporting/home_reporting.cfm) which contains environmental monitoring data provided by LANL and the DOE OB. Data retrieved from this site were specific to Pajarito Plateau and PCBs, metals, and radionuclide data collected between 2004 and 2013. Relevant SOPs, including QAPPs, were reviewed for LANL and DOE OB to assess for consistency with the Bureau's data collection activities and quality assurance procedures. These procedures met the minimum SWQB submitted data requirements and were therefore found to be acceptable. Specific to this review were the externally-created data qualifiers used by LANL, DOE OB, and their associated laboratories. All practical attempts were made to equate these qualifier codes with those used and generated by SWQB and the State Laboratory Division Water Chemistry Lab. Two unique SWQB QA qualifiers were created and attributed to the dataset in order to efficiently assess the quality of the data for inclusion into the Integrated List. These unique qualifiers (X & R) indicate whether or not a particular quality aspect of the data were uncertain but that the data may still be acceptable for assessment purposes after the significance of that quality aspect has been evaluated against the applicable water quality criterion (X) or that the data should be rejected (R) based on associated qualifiers and should not be used for assessment purposes. The absence of a SWQB qualifier or null qualifier indicated that the data needs no further qualification beyond what was provided within the original dataset and is acceptable for all assessment purposes.

Many of the Intellus data qualifier definitions provided slight distinctions with regards to the degree of bias present in the sample, detection within, above, or below some defined detection limit, matrix interferences and allowable lab tolerance for upper and lower limit percentiles, and blank detections and concentrations etc. In order to equate the relevance of these qualifiers to the acceptability of the data for inclusion into the assessment processes for the Integrated List, all definitions of each qualifier were scrutinized for their significance. A combination of best professional judgment, SWQB qualifier criteria, and SWQB laboratory analysis subject matter expert consultation was used in making the final determinations.

Specifically, X is a generic qualifier used to indicate a general lack of confidence in the data or indication of uncertainty, bias, or some degree of estimation based on one or more associated data qualifiers. Absent further information to assess the quality of the data, SWQB qualifier criteria, SWQB laboratory

analysis subject matter expert consultation, and best professional judgment was used in qualifying data with a bias toward conservatism. Data qualified with an X are therefore available for assessment purposes but remain qualified to indicate that these data have associated qualifiers that indicate a general lack of confidence and their use for assessment may be limited based on the original qualifiers. Generically speaking, these data are similar to estimated data whose quality and value may still be present and considered by the data user, but one or more associated qualifiers require that the significance of the qualifier be evaluated against the applicable water quality criterion. In this case, data qualified with an X are distinguished from data qualified with an R which indicates rejection based on one or more associated qualifiers. Data qualified with an R should not be used for assessment purposes. An example of data that were rejected and qualified with an R include documented hold time violations either based on an existing qualifier or a calculated from the sample and analysis date. All other SWQB unqualified data present within the dataset are considered acceptable for assessment purposes and inclusion into the Integrated List. All original and associated Intellus data qualifiers are retained and remain unchanged within the QA reviewed and submitted qualified data file.

The SWQB QA Officer has assessed all relevant QA and procedural documentation submitted or acquired in conjunction with the above described datasets for their usefulness in the development of the 2014 Integrated List. All data received, acquired, or requested data and the associated quality documentation have been archived in individual folders on SWQB public drive.

References

NMED/SWQB 2013. *Standard Operating Procedures for Data Collection*. New Mexico Environment Department/Surface Water Quality Bureau. <http://www.nmenv.state.nm.us/swqb/SOP>

NMED/SWQB 2013 *Water Quality Data Submittal Guidance*, New Mexico Environment Department/Surface Water Quality Bureau. <http://www.nmenv.state.nm.us/swqb/DataSubmittals>

NMED/SWQB 2013. *Quality Assurance Project Plan for Water Quality Management Programs (QAPP)*. New Mexico Environment Department/Surface Water Quality Bureau, February 2013. <http://www.nmenv.state.nm.us/swqb/QAPP/2013QAPP-Approved.pdf>

CFR 136 Table II—REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES. Federal Register / Vol. 77, No. 97 / Friday, May 18, 2012 / Rules and Regulations. <http://www.gpo.gov/fdsys/pkg/FR-2012-05-18/pdf/2012-10210.pdf>

Los Alamos National Laboratory/Department of Energy Oversight Bureau New Mexico Environment Department 2014. Intellus New Mexico Public Access Environmental Monitoring Data Database. <http://www.intellusnmdata.com/index.cfm>