WQX User Meeting
April 23, 2020

There was a total of 79 participants.
The next WQX User Call is scheduled for May 28, 2020.

Agenda:
1. Introduction to WQX/WQX Web 3.0
2. Demonstration of WQX Web 3.0
3. Open Discussion

This month, we will highlight some WQX / WQX Web 3.0 release features, business rules and documentation.

1. Introduction to WQX/WQX Web 3.0

The new schema was released to both WQX and WQX Web on April 13, 2020. The release notes can be found at the end of this document and can be downloaded from: ftp://newftp.epa.gov/storet/wqx/draft/schemav3/ - WQX 3.0 Release Notes.docx

2. Demonstration of WQX/WQX Web 3.0 release features, business rules and documentation

WQX / WQX Web 3.0 production release on April 13, 2020.

WQX 3.0 streamlines the biological data model to make it simpler, while also providing critical new data elements to make the biological data more meaningful and more useful. It also adds some new rules around data elements that were identified as critical for data reuse per the best practices documents that we've put out over the past couple years. Lastly, WQX 3.0 puts WQX completely in-line with the data elements available in the Water Quality Portal. USGS had added a number of elements to the Portal that weren't in WQX. We have now added those to WQX.

WQX Version 2.2 is 100% backwards compatible with v2.1 and provides expanded data element lengths for various key description text type elements. See the schema change log v2.2 and Data Exchange Template v2.2 for more details. Version 3.0 adopts new elements, some of which are not backwards compatible with version 2.1. See the schema change log v3.0 and Data Exchange Template v3.0 for more details.
WQX 3.0 addresses quality assurance by applying supported best practices and business rules. Good QA/QC ensures that your data can be reused by another user for analysis and safeguards against misuse.

New version 3.0 supported QA/QC business rules are outlined via both the WQX 3.0 Flow Configuration Document and guidance documents at the WQX website (www.epa.gov/waterdata/water-quality-data-wqx):
Best Practices for Sharing Nutrients Data.
Best Practices for Sharing Metals Data.
Best Practices for Sharing Macroinvertebrates Data.

WQX Navigation Page: https://cdx.epa.gov/WQXWeb/StaticPages/GlossaryWqx.htm

- WQX resources
- WQX Web resources
- Helpdesk and Data assistance
- Video library (2-5 min) – Coming soon…

- Below are the best practice documents: **The Guides are designed to be used with the 2.0 version of WQX.** Some of these practices will become required elements in WQX 3.0 (scheduled for release in 2018 or 2020), so we encourage data submitters to address them now.
  Navigation Page URL: https://cdx.epa.gov/WQXWeb/StaticPages/GlossaryWqx.htm

  Introduction to QA Workgroup's Best Practices for WQX / Water Quality Portal.

  The Water Quality eXchange (WQX) Nutrient & Metals Best Practices Guide was created to guide organizations in submitting nutrient data to WQX and to address other metadata issues with data to support the submission of nutrient information. This guide was also created to make submitting nutrient datasets more user-friendly, promote consistency when submitting data and thus remove confusion and ambiguity for secondary data users. It was produced through both a WQX Nutrient QA Workgroup and Metals QA Workgroup respectively and comprised of representatives from EPA, USGS and several States which were also members of the STORET/WQX Users Group. The QA Workgroup addressed six areas of concern with respect to documenting nutrient data to improve its value for secondary users. For metals, this guidance does not require any new metadata to be submitted to WQX but does advise data submitters to make adjustments to characteristic names with new characteristic name proposals. The QA Workgroup included (1) duplicate monitoring locations, (2) addressing duplicate or ambiguous nutrient characteristic names (synonyms) in WQX (3), how to correctly use the WQX elements "method speciation" and "sample fraction", (4) correctly submitting values above or below detection limits, (5) National analytical methods, and (6) how to submit a complete and unambiguous nutrient result. This Guide is designed to be used with the 2.0 version of WQX. Some of these practices will become required elements in WQX 3.0 (scheduled for release in 2018), so we encourage data submitters to address them now.

  Nutrient Conclusions: A complete nutrient result contains a Characteristic name, a result (or result detection condition) value and unit, a speciation, a sample fraction, and method. If reported as above or below a quantitation limit by the laboratory, it will need to contain the detection limit type, value, and unit instead of a result value and unit.

  Metals Conclusions: Documenting Method Speciation, Ions and Sample Fraction for Metals Characteristics Speciation Metals are only ever reported as a single speciation, thus the workgroup determined that method speciation is a nonessential metadata element and should not be a required data element. For example: Aluminum is always reported "as Al", thus there is no need to require data submitters to report metadata that can be reasonably assumed.

  - **Aligning domain values within Water Quality Portal data sources**

- Reference Document: ftp://newftp.epa.gov/storet/xfer/today/WQPs_public_srsnames+speciation_February_2020.xlsx
- WQP Web services guide: Characteristic names identify different types of environmental measurements. The names are derived from the USEPA Substance Registry System (SRS). USGS uses parameter codes for the same purpose and has **associated most parameters** to SRS names.

NEW Features:

1. Import Configurations, User Supplied element names
2. New Elements: NationalAquiferCode, LocalAquiferCode, LocalAquiferContext, GroupSummaryCount, GroupSummaryWeightMeasure, ComparableAnalyticalMethod, LaboratorySampleSplitRatio, ResultSamplingPointName, ResultSamplingPointType, ResultSamplingPointPlaceInSeries (~~SamplingComponentPlaceInSeries~~)
3. WQP Elements: HydrologicCondition, HydrologicEvent,
4. Key Elements: ActivityIdentifierUserSupplied, HabitatSelectionMethod, CollectionArea, TargetCount, ProportionSampleProcessedNumeric , SampleContainerLabelName, CharacteristicNameUserSupplied, SubjectTaxonomicNameUserSupplied, SubjectTaxonomicNameUserSuppliedReferenceText,

NEW Rules:

1. Rule #32 Either Result Measure Value and/or Result Detection Condition Text must be reported
2. Rule #35 ResultMeasureQualifierCode will support new WQX 3.0 measure qualifiers as independent child elements <MeasureQualifierCode> in parent <ResultMeasure> with a maximum number of 6 codes.
3. Rule #41 Removed (v3.0) Sample Collection Method is required when Activity Type Code contains the word "Sample"
4. Rule #46 ResultAnalyticalMethod may be required depending on the value provided for CharacteristicName.
5. See the domain value list for CharacteristicName for more information
6. Rule #47 MethodSpeciation may be required depending on the value provided for CharacteristicName.
7. See the domain value list for CharacteristicName for more information

Frequently Asked Questions:

- Resubmitting Data. Will it cause a problem?
  - Projects perform an INSERT new or UPDATE existing
  - Monitoring Locations perform an INSERT new or UPDATE existing
    - For each Primary Entity you must submit the complete record. Partial submission will NULL existing values.
  - Activity and Results perform an DELETE and INSERT (for both new or existing)

    - Caution ACTIVITY ID are unique like SSN#.
        - For each Primary Entity you must submit the complete record. Partial submission will REMOVE existing results.
    -
- Measurement Unit = "None" is assigned for all General Text characteristic names.
- Method Speciation = "None" can be assigned for all assumed characteristic names (ie Metals)
- Activity Elements - This Activity ID matches another one (from 1st sheet, row ####). So all other Activity elements must match as well. However, an Activity ELEMENT is different on this row.

Addressing quality assurance in your data

Good QAQC ensures that your data can be reused by another user for analysis, as well as safeguarding against misuse. The documents below will help you improve the quality of your data.

- Best Practices for Sharing Nutrients Data (10p, 285K)
- Best Practices for Sharing Metals Data (6p, 151K)

Exchange Network - Water Quality Exchange Visit this site for information on WQX XML schema, data exchange template and Node information.

STEP# 2	Data Dictionary and WQX Business Rules
URL:	https://www.exchangenetwork.net/data-exchange/wqx/
	Download the Data Exchange Template (excel file) - data dictionary and element definition.
	Download the Flow Configuration Document (acrobat file) - data validation rules, services, and schema. The principle **document** which captures the detailed data exchange processing rules governing **WQX** using narrative text, diagrams and examples.
	WQX Domain Values tables provide data elements to assist data owners and users in conforming to a consistent nomenclature and can be queried to determine the EPA-supplied values.

Frequent Questions about WQX

- **Web Client (no software installed)**
- **Virtual Node Client**

Frequently Asked Questions (FAQs) for Submitting Season eBeaches Notification and Monitoring Data

- **Node / Node Client**

Validation rules specify permissible **attribute** configurations and general relationships on an element.

STEP# 1	WQX Business Rule 3.0
Rule #1	When ElectronicAddressText or ElectronicAddressTypeName is reported, both must be reported.
Rule #2	When TelephoneNumberText or TelephoneNumberTypeName is reported, both must be reported.
Rule #3	When AddressText or AddressTypeName is reported, both must be reported.
Rule #4	When HorizonitalCollectionMethodName is “Interpolation-Map”, SourceMapScale must be reported.
Rule #5	When VerticalMeasure's MeasureValue is reported, the following also must be reported: VerticalMeasure's MeasureUnitCode, VerticalCollectionMethodName, VerticalCoordinateReferenceSystemDatumName.
Rule #6	Either ProjectDescriptionText or Project's AttachedBinaryObject must be reported.
Rule #7	Activity Depth/Height can be reported in only one of the following two ways (but not both): a. Specific depth using ActivityDepthHeightMeasure's MeasureValue. b. Depth Range using ActivityTopDepthHeightMeasure's MeasureValue and ActivityBottomDepthHeightMeasure's MeasureValue. i. This method must be used when ActivityTypeCode is “Sample-Integrated Vertical Profile”.
Rule #8	When ActivityTypeCode contains the word 'Logger', DataLoggerLineName must be reported.
Rule #9	When ActivityMediaName is "Tissue" then BiologicalIntentName must also be "Tissue" (and visa-versa)
Rule #10	When ActivityMediaName (or BiologicalIntentName) is "Tissue", then SampleTissueAnatomyName must be reported.
Rule #11	When ActivityMediaName is "Biological" then AssemblageSampledName must be reported
Rule #12	When ResultDetectionConditionText is 'Not Detected', 'Present Above Quantification Limit' or 'Present Below Quantification Limit', then DetectionQuantitationLimitTypeName and DetectionQuantitationLimitMeasure must be reported.
Rule #13	CharacteristicName and ResultStatusIdentifier must be reported.

	Rule #14	When DetectionQuantitationLimit's MeasureValue is reported, DetectionQuantitationLimit's MeasureUnitCode must be reported.
	Rule #15	ActivityDescription's MonitoringLocationIdentifier may be required depending on the value provided for ActivityTypeCode. See the domain value list for ActivityTypeCode for more information.
	Rule #16	ResultAnalyticalMethod may be required depending on the value provided for ActivityTypeCode. See the domain value list for ActivityTypeCode for more information. a. However, ResultAnalyticalMethod is never required if BiologicalIntentName is "Individual", "Population Census", "Frequency Class", or "Group Summary"
	Rule #17	ResultSampleFractionText may be required depending on the value provided for CharacteristicName. See the domain value list for CharacteristicName for more information.
	Rule #18	ResultAnalyticalMethod's MethodIdentifierContext must either match a value from the AnalyticalMethodContext domain list or it must be the same as the value for the OrganizationIdentifier provided in the submission file. a. If the MethodIdentifierContext matches a value from the domain list, then the MethodIdentifier must also match a value from the AnalyticalMethod domain list (for that Context). Furthermore, MethodName, MethodQualifierTypeName, and MethodDescriptionText are not required and will be ignored (since only the Identifier and IdentifierContext are needed to uniquely identify the Analytical Method). b. If the MethodIdentifierContext matches your OrganizationIdentifier (indicating your own method), then MethodIdentifier and MethodName are both required, but do not need to match a value from the domain list (since they are your own). Additionally, MethodQualifierTypeName and MethodDescriptionText can be provided, but are optional, to further describe the Analytical Method used.
	Rule #19	ProjectIdentifier, MonitoringLocationIdentifier, ActivityIdentifier, IndexIdentifier and ActivityGroupIdentifier must be unique within an Organization. The value for each of these identifiers may occur only once in a submission file. a. Unique identifiers are treated as case-insensitive by WQX. For example, the following three identifiers would be treated as identical: "Mx571", "mx571", "MX571".
	Rule #20	ResultMeasure's ResultMeasureValue may be constrained to a list of domain values depending on the value provided for CharacteristicName. See the domain value list for CharacteristicName for more information.

	Rule #21	If a numeric value is reported for ResultMeasureValue, then ResultMeasure's MeasureUnitCode and ResultValueTypeName are required. a. The exception to this is when the ResultMeasureValue is a Characteristic Pick List Value. These do not have units.
	Rule #22	If a CountyCode is reported then a StateCode must also be reported.
	Rule #23	If NetTypeName = "Net/Horizontal Tow" then BoatSpeedMeasure is required.
	Rule #24	If NetTypeName is reported then the SampleCollectionEquipmentName must be one that relates to that type of equipment.
	Rule #25	ActivityMetric's MetricTypeIdentifierContext must either match a value from the MetricTypeContext domain list or it must be the same as the value for the OrganizationIdentifier provided in the submission file. a. If the MetricTypeIdentifierContext matches a value from the domain list, then the MetricTypeIdentifier must also match a value from the MetricType domain list (for that Context). Furthermore, MetricTypeName, MetricTypeCitation, MetricTypeScaleText, and FormulaDescriptionText are not required and will be ignored (since only the Identifier and IdentifierContext are needed to uniquely identify the MetricType). b. If the MetricTypeIdentifierContext matches your OrganizationIdentifier (indicating your own metric), then MetricTypeIdentifier and MetricTypeName are both required, but do not need to match a value from the domain list (since they are your own). Additionally, MetricTypeCitation, MetricTypeScaleText, and FormulaDescriptionText can be provided, but are optional, to further describe the Metric Type used.
	Rule #26	If BiologicalIntentName is "Group Summary" then GroupSummaryCount or GroupSummaryWeightMeasure must be reported
	Rule #27	If BiologicalIntentName is "Frequency Class" then Result's CharacteristicName must be "Count"
	Rule #28	If BiologicalIntentName is "Population Census" then Result's CharacteristicName must be "Count" or "Total Sample Weight"
	Rule #29	FrequencyClassDescriptorUnitCode may be required depending on the value provided for FrequencyClassDescriptorCode. See the domain value list for FrequencyClassType for more information.
	Rule #30	FrequencyClassInformation's LowerClassBoundValue and UpperClassBoundValue may be required depending on the value provided for FrequencyClassDescriptorCode. See the domain value list for FrequencyClassType for more information

	Rule #31	Biological Intent Name and Subject Taxonomic Name must be reported when Activity Media Name is "Biological" or "Tissue"
	Rule #32	Either Result Measure Value and/or Result Detection Condition Text must be reported
	Rule #33	Measure Unit is required when Measure Value is supplied
	Rule #34	Measure Value is required when Measurement Unit is supplied
	Rule #35	ResultMeasureQualifierCode will support new WQX 3.0 measure qualifiers as independent child elements <MeasureQualifierCode> in parent <ResultMeasure> with a maximum number of 6 codes.
	Rule #36	Habitat Selection Method is required when Activity Assemblage is "Benthic Macroinvertebrates"
	Rule #37	Target Count is required when the Activity Assemblage is "Benthic Macroinvertebrates"
	Rule #38	Proportion Sample Processed Numeric is required when the Activity Assemblage is "Benthic Macroinvertebrates"
	Rule #39	Proportion Sample Processed Numeric will be set to NULL when value is equal to 0.000000001 and the Activity Assemblage is "Benthic Macroinvertebrates"
	Rule #40	Proportion Sample Processed Numeric must be a positive number between 0 and 1"
	Rule #41	Removed (v3.0) Sample Collection Method is required when Activity Type Code contains the word "Sample"
	Rule #42	Statistical N-Value Numeric must be a positive whole number
	Rule #43	Analytical Method is required when submitting a Comparable Analytical Method
	Rule #44	Comparable Analytical Method Identifier Context must match a national value from the domain list
	Rule #45	If ResultDetectionQuantitationLimit is reported, then DetectionQuantitationLimitTypeName and DetectionQuantitationLimitMeasure are required
	Rule #46	ResultAnalyticalMethod may be required depending on the value provided for CharacteristicName. See the domain value list for CharacteristicName for more information
	Rule #47	MethodSpeciation may be required depending on the value provided for CharacteristicName. See the domain value list for CharacteristicName for more information
	Rule #48	Lab Sample Preparation Method is optional.
	Rule #49	Sample Preparation Method, Sample Container Type Name, Sample Container Color Name, and Sample Transport Storage Description are all optional.