

December 4, 2023



# Santa Ana River Surface WQ Monitoring Program Quality Assurance Project Plan (QAPP)



Creating a Better Tomorrow, **TODAY**™

# QAPP Document Format - USEPA Guidance for QAPPs

## Project Management

- Title and Approval Sheet
- Table of Contents
- Distribution List
- Project Organization
- Problem Background
- Project Description
- Quality Objectives
- Special Training/Certification
- Documentation/Records

## Data Generation & Acquisition

- Sampling Process Design
- Sampling Methods
- Sampling Handling and Custody
- Analytical Methods
- Quality Control
- Instrument Testing, Inspection, and Maintenance
- Instrument Calibration and Frequency
- Inspection of Supplies and Consumables
- Non-Direct Measurements
- Data Management

## Assessment and Oversight

- Assessments and Response Actions
- Reports to Management

## Data Validation and Usability

- Data Review, Verification, and Validation
- Verification and Validation Methods
- Reconciliation with User Requirements

# Distribution List

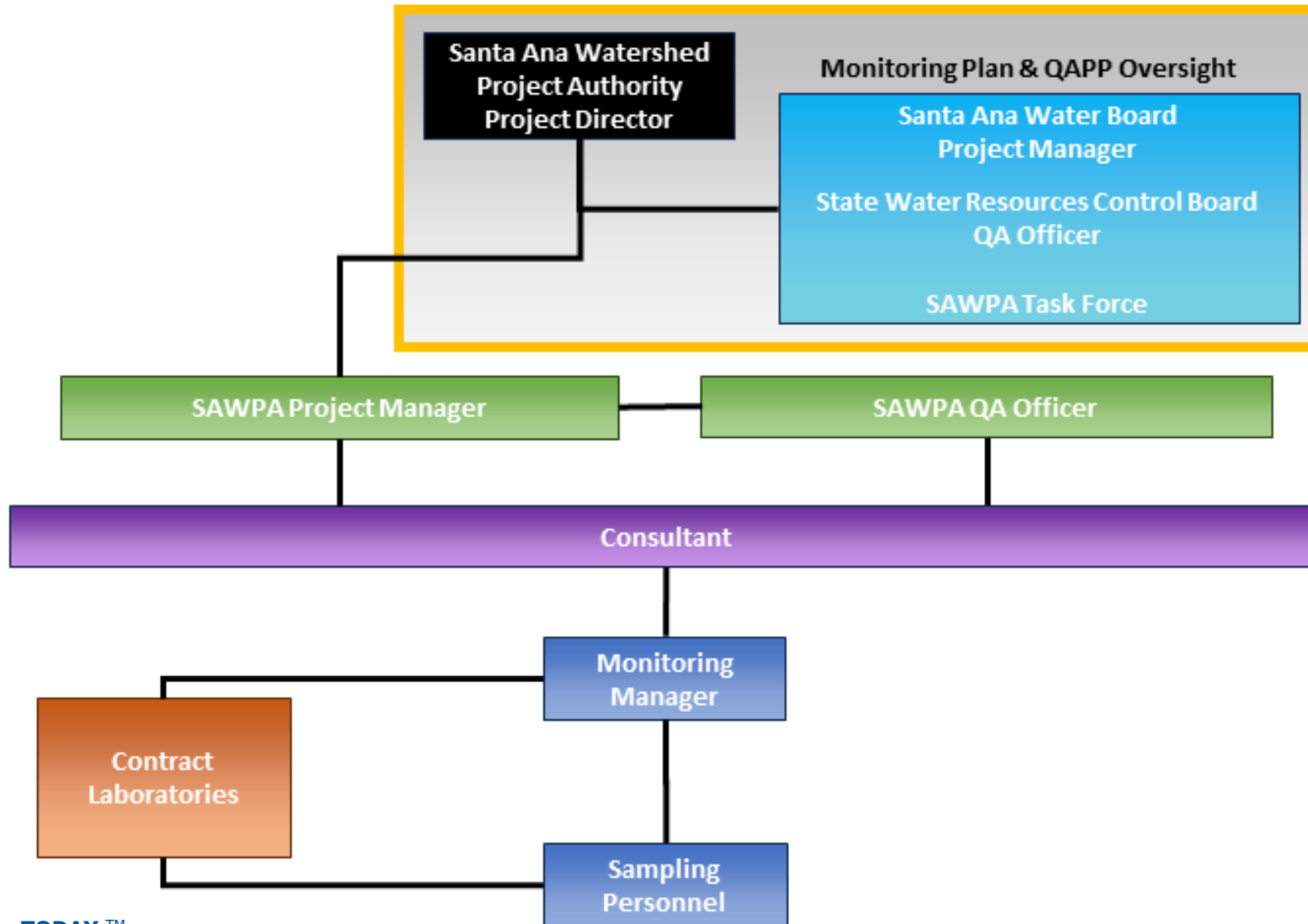
- Task Force members to review and verify contacts

Table 1-1 Quality Assurance Project Plan Distribution List

Name	Role	Agency	Contact Number	Email
Rick Whetsel	Project Director (PD)	Santa Ana River Watershed Project Authority (SAWPA)	(951) 354-4222	<a href="mailto:rwhetsel@sawpa.org">rwhetsel@sawpa.org</a>
Ian Achimore	Project Manager (PM)		(951) 354-4233	<a href="mailto:iachimore@sawpa.org">iachimore@sawpa.org</a>
Rachel Gray	Quality Assurance and Quality Control (QA/QC) Officer		(951) 354-4242	<a href="mailto:rgray@sawpa.org">rgray@sawpa.org</a>
James Bean	Task Force Agency Member	Beaumont Cherry Valley Water District	(951) 845-9581 x263	<a href="mailto:james.bean@bcvwd.org">james.bean@bcvwd.org</a>
Edgar Tellez Foster		Chino Basin Watermaster	(909) 484-3888	<a href="mailto:etellezfoster@cbwm.org">etellezfoster@cbwm.org</a>
		City of Banning		
Thaxton Van Belle		City of Beaumont		<a href="mailto:tvabelle@beaumontca.gov">tvabelle@beaumontca.gov</a>
Melissa Estrada		City of Corona	(951) 736-2479	<a href="mailto:Melissa.estrada-maravilla@ci.corona.ca.us">Melissa.estrada-maravilla@ci.corona.ca.us</a>
Jung Joon Park		City of Redlands		<a href="mailto:jpark@cityofredlands.org">jpark@cityofredlands.org</a>
Thomas Crowley		City of Rialto	(909) 820-8056	<a href="mailto:tjcrowley@rialto.ca.gov">tjcrowley@rialto.ca.gov</a>
Drew Faherty		City of Riverside		<a href="mailto:dfaherty@riversideca.gov">dfaherty@riversideca.gov</a>
Jennifer Shepardson		Colton/San Bernardino Regional Tertiary Treatment and Wastewater Reclamation	(909) 453-6020	<a href="mailto:jennifer.shepardson@sbmwd.org">jennifer.shepardson@sbmwd.org</a>
Doug Edwards		Eastern Municipal Water District		<a href="mailto:edwardsd@emwd.org">edwardsd@emwd.org</a>
Lenai Hunter		Elsinore Valley Municipal Water District	(951) 674-3146 x8329	<a href="mailto:lhunter@evmwd.net">lhunter@evmwd.net</a>

Name	Role	Agency	Contact Number	Email
John Russ		Inland Empire Utilities Agency	(909) 993-1834	<a href="mailto:j russ@ieua.org">j russ@ieua.org</a>
		Irvine Ranch Water District		
Bryan Smith		Jurupa Community Services District	(951) 685-7434 x139	<a href="mailto:bsmith@jcsd.us">bsmith@jcsd.us</a>
Kevin O'toole		Orange County Water District (OCWD)	(714) 378-8248	<a href="mailto:kotoole@ocwd.com">kotoole@ocwd.com</a>
Greg Woodside		San Bernardino Valley Municipal Water District	(909) 387-9241	<a href="mailto:gregw@sbvmwd.com">gregw@sbvmwd.com</a>
Matt Howard		San Geronio Pass Water Agency	(951) 845-2577	<a href="mailto:mhoward@sgpwa.com">mhoward@sgpwa.com</a>
Jeff Pape		Temescal Valley Water District	(951) 667-6323	<a href="mailto:jeffp@temescalvwd.com">jeffp@temescalvwd.com</a>
Jennifer McMullin		Western Riverside County Regional Wastewater Authority/Western Municipal Water District	(951) 571-7236	<a href="mailto:jmcmullin@wmwd.com">jmcmullin@wmwd.com</a>
Ashley Gibson		Yucaipa Valley Water District	(909) 795-2491 x4	<a href="mailto:agibson@yvwd.us">agibson@yvwd.us</a>
Cindy Li		Santa Ana Regional Water Board	(951) 782-4906	<a href="mailto:Cindy.Li@waterboards.ca.gov">Cindy.Li@waterboards.ca.gov</a>
Amanda Porter	Laboratory PM	Babcock Laboratories	(951) 653-3351	<a href="mailto:aporter@babcocklabs.com">aporter@babcocklabs.com</a>
Julia Sudds	Laboratory QA/QC Manager			<a href="mailto:jsudds@babcocklabs.com">jsudds@babcocklabs.com</a>
Nan Jia	Consultant PM	CWE	(714) 526-7500 x217	<a href="mailto:njia@cwecorp.com">njia@cwecorp.com</a>
Jason Pereira	Consultant QA/QC Manager		(714) 526-7500 x211	<a href="mailto:jpereira@cwecorp.com">jpereira@cwecorp.com</a>

# Project Organization





# Project Description

- Quarterly Monitoring
  - Monitoring Locations
  - Constituents
    - TDS
    - Nitrate as N
    - Nitrite as N
    - Ammonia as N
    - Specific Conductance (field measurement)
    - TIN Calculation
  - Water Quality Objectives (WQOs)
- CEDEN Data Upload

Monitoring Location	Reach	WQOs	
		TDS (mg/L)	TIN(mg/L)
SAR @ E Street	5	300	5
SAR @ Riverside Avenue	4	550	10
SAR @ Mission			



# Quality Objective Criteria for Measurement Data

- Method Detection Limit (MDL)
- Reporting Limit (RL)
- Precision
- Accuracy and Bias
- Representativeness
- Completeness
- Comparability
- Sensitivity

Analytes	Units	Accuracy	Precision	Recovery	Reporting Limits (RLs)	Completeness
TDS	mg/L	80-120%	25%	80-120%	1	90%
Nitrite + Nitrate as N	mg/L	80-120%	25%	80-120%	0.01	90%
Ammonia as N	mg/L	80-120%	25%	80-120%	0.01	90%

# Documents and Record Keeping

Document/Record	Location	Retention (years)	Format
Project Plan			
QAPP, amendments and appendices	SAWPA Headquarters	≥5 Years	Electronic or Paper
QAPP distribution documentations			
Field Documents			
Field staff training records	SAWPA Headquarters	≥5 Years	Electronic or Paper
Field equipment calibration/maintenance logs			
Field observation forms			
YSI data			Electronic
Flow data			
Rainfall data			
Laboratory Documents			
Laboratory analytical results and reports	SAWPA Headquarters	≥5 Years	Electronic or Paper
Laboratory chain of custody forms			
Laboratory calibration records	Contract Laboratory		
Laboratory equipment maintenance logs			
Laboratory quality control manuals			
Laboratory SOPs			

# Sampling Process Design

---

- Quarterly sampling
- *(Sampling will occur during daylight hours following a storm event)*
- Event 1: January - March
- Event 2: April - June
- Event 3: July - September
- Event 4: October - December
- Field QA/QC samples will be collected once per year



# Sampling Process Design

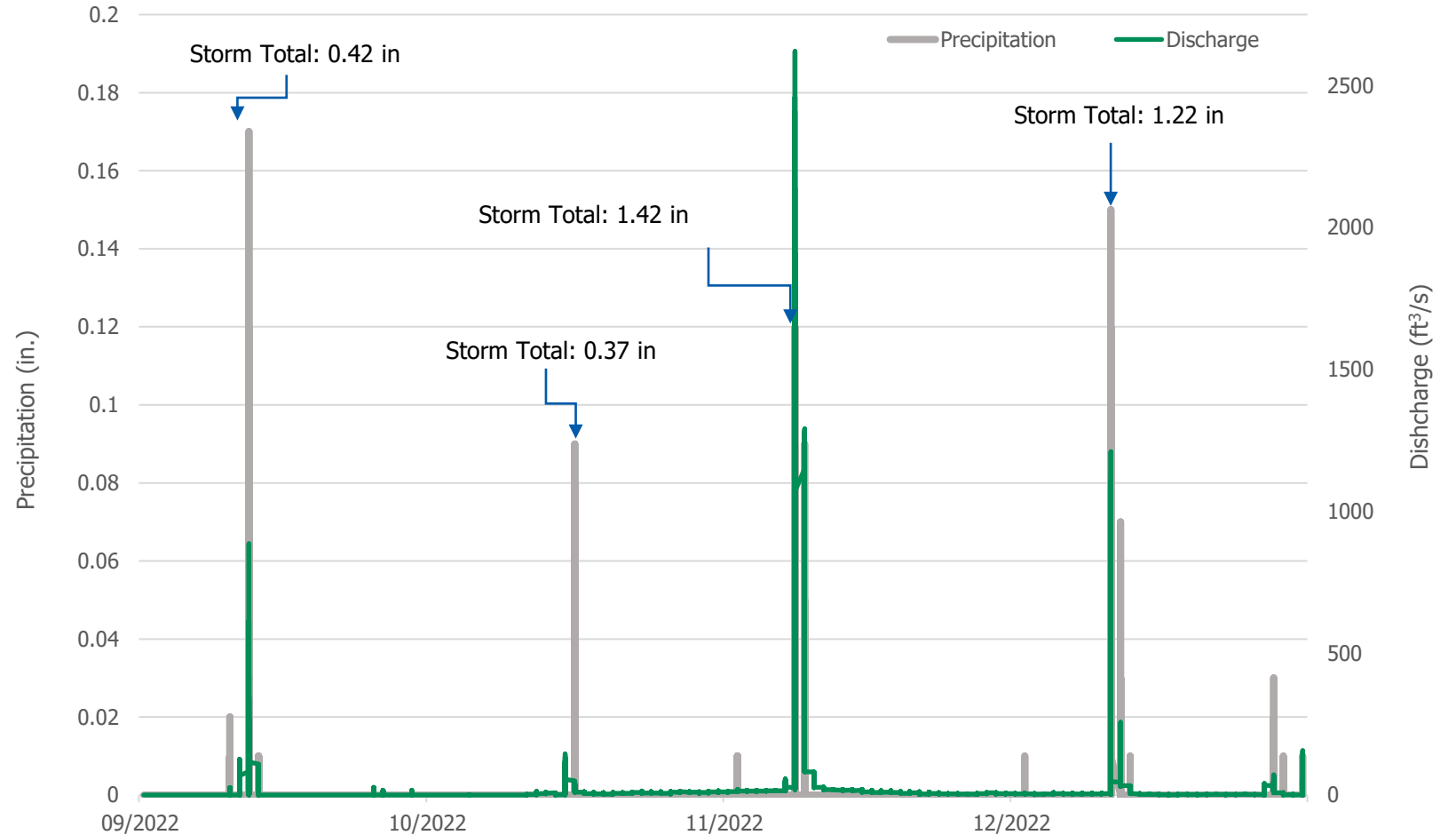
- 10-year flow/precipitation analysis
- E Street is mostly dry under dry-weather conditions
- Quarter 3 has minimal precipitation
- Significant storm event is required to be targeted

Year	Monthly Mean Discharge (cubic feet per second)											
	Quarter 1			Quarter 2			Quarter 3			Quarter 4		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	3.3	4.5	33.3	17.3	0.4	0.0	0.4	2.0	0.6	0.1	6.3	27.0
2013	7.9	23.3	13.8	0.7	0.5	0.2	0.2	1.9	0.0	1.7	47.1	3.2
2014	2.1	65.2	30.3	8.2	0.0	0.0	0.0	23.2	3.5	0.0	3.8	99.3
2015	5.2	20.6	5.6	3.7	3.5	0.1	14.6	0.2	18.2	5.2	6.3	9.5
2016	72.7	3.8	11.5	10.8	6.3	0.5	0.3	0.4	0.5	1.7	10.5	92.3
2017	297.6	26.1	12.1	2.2	6.4	0.8	0.0	0.6	1.1	0.4	1.6	1.0
2018	65.5	3.8	14.2	0.2	0.3	0.0	0.0	0.0	0.0	6.0	19.5	44.1
2019	52.3	136	36.0	7.7	122	18.4	0.0	0.0	0.1	0.0	45.1	44.5
2020	2.1	2.0	78.8	120	0.5	0.4	0.0	0.0	0.6	0.8	4.9	14.4
2021	39.9	12.1	10.9	1.1	3.2	1.4	0.6	0.0	0.8	5.5	1.5	112
2022	3.9	8.5	12.8	0.3	0.9	0.2	0.0	0.2	5.5	6.5	52.3	11.9
<b>Avg</b>	<b>50.2</b>	<b>27.8</b>	<b>23.6</b>	<b>15.7</b>	<b>13.1</b>	<b>2.0</b>	<b>1.5</b>	<b>2.6</b>	<b>2.8</b>	<b>2.5</b>	<b>18.1</b>	<b>41.7</b>

Year	Monthly Precipitation (inch)											
	Quarter 1			Quarter 2			Quarter 3			Quarter 4		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	0.79	0.81	1.88	1.66	0.06	0	0.11	0	0	0.44	1.02	4.08
2013	1.55	1.21	0.95	0.05	0.05	0.01	0.1	0.05	0.01	0.81	3.55	0.48
2014	0.04	2.4	0.59	1.01	0	0	0	1.99	1.55	0.01	0.62	4.58
2015	0.59	1.38	0.29	0.07	0.75	0	0.99	0	1.81	0.86	0.55	1.13
2016	3.41	0.32	1.46	0.98	0.13	0	0	0	0	1.17	1.27	5.62
2017	8.59	3.16	0.53	0	0.41	0	0	0.46	0.36	0	0.01	0
2018	2.68	0.65	2.88	0	0.58	0	0.01	0	0	0.79	1.29	1.37
2019	5.27	7.68	1.78	0.07	1.55	0	0	0	0.05	0	2.21	2.79
2020	0.19	0.31	3.9	3.34	0	0	0	0	0	0	1.07	1.64
2021	3.12	0.3	1.35	0	0.02	0.08	0.39	0	0.22	0.84	0	7.89
2022	0.17	0.34	0.96	0.21	0.09	0.01	0	0	0.48	0.38	1.47	2.28
<b>Avg</b>	<b>2.4</b>	<b>1.69</b>	<b>1.51</b>	<b>0.67</b>	<b>0.33</b>	<b>0.0</b>	<b>0.1</b>	<b>0.2</b>	<b>0.4</b>	<b>0.5</b>	<b>1.19</b>	<b>2.9</b>

# Sampling Process Design

Sampling Trigger:  
Storm event with over  
0.5" precipitation



## Sampling Method

- Sample collection
  - Clean Hands/Dirty Hands Method
  - Field QA/QC sample collections
- Field Measurement
- Field Documentation

## Sampling Handling & Custody

- Pre-sampling Procedures
- Sample Containers & Labels
- Chain-of-Custody
- Laboratory Custody Procedures

# Health and Safety

- Trip and Falls
- Fast-Moving Flow
- Animals and Insects
- People Experiencing Homelessness





# Quality Control Requirements

QC Sample Type	QA Parameter	Frequency <sup>1</sup>	Acceptance Limits	Corrective Action
<b>QC Requirements – Field</b>				
Field Blank	Contamination	5% of samples	< MDL	Examine field log. Identify contamination source. Qualify data as needed.
Field Duplicate	Precision	5% of samples	RPD < 25% if  Difference  > RL	Reanalyze both samples if possible. Identify variability source. Qualify data as needed.
<b>QC Requirements – Laboratory</b>				
Method Blank	Contamination	1 per analytical batch	< MDL	Identify contamination source. Reanalyze method blank and samples in batch. Qualify data as needed.
Laboratory Duplicate	Precision	1 per analytical batch	RPD < 25% if  Difference  > RL	Recalibrate and reanalyze.
MS	Accuracy	1 per analytical batch	80-120% Recovery	Check LCS/ Certified Reference Material (CRM) recovery. Attempt to correct matrix problem and reanalyze samples. Qualify data as needed.
Matrix Spike Duplicate (MSD)	Precision	1 per analytical batch	RPD < 30% if  Difference  > RL	Check lab duplicate RPD. Attempt to correct matrix problem and reanalyze samples. Qualify data as needed.
Laboratory Control Sample	Accuracy	1 per analytical batch	80-120% Recovery	Recalibrate and reanalyze LCS/ CRM and samples.

<sup>1</sup> "Analytical batch" refers to a number of samples (not to exceed 20 environmental samples plus the associated QC samples) that are similar in matrix type and processed/prepared together under the same conditions and same reagents (equivalent to preparation batch).

# Instrument/Equipment and Supplies

- YSIs
- Laboratory Analytical Instruments
- Consumables:
  - Calibration buffer solutions
  - Sample bottles
  - PPEs
  - And more



---

## Non-Direct Measurement

- OCWD and USGS Data Crosswalk
- QA/QC Procedures for Non-Direct Measurement Data

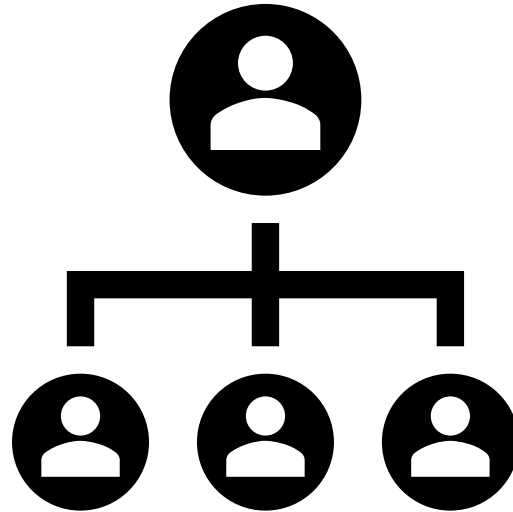
## Data Management

- Field Measurement Data
- Field Observation Forms
- Laboratory Data
- Record Keeping

# Assessment and Oversight

---

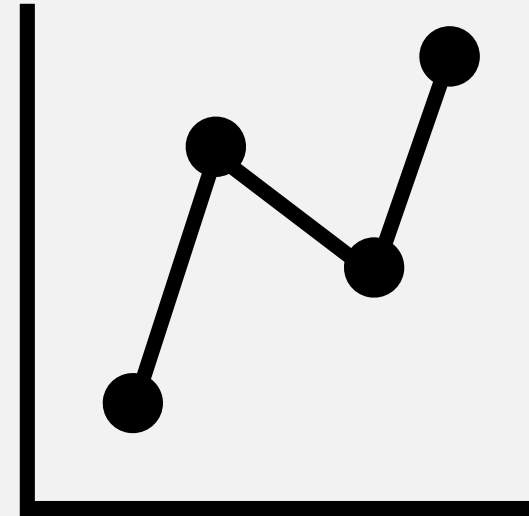
- Assessment and Response Actions
- Reports to Management





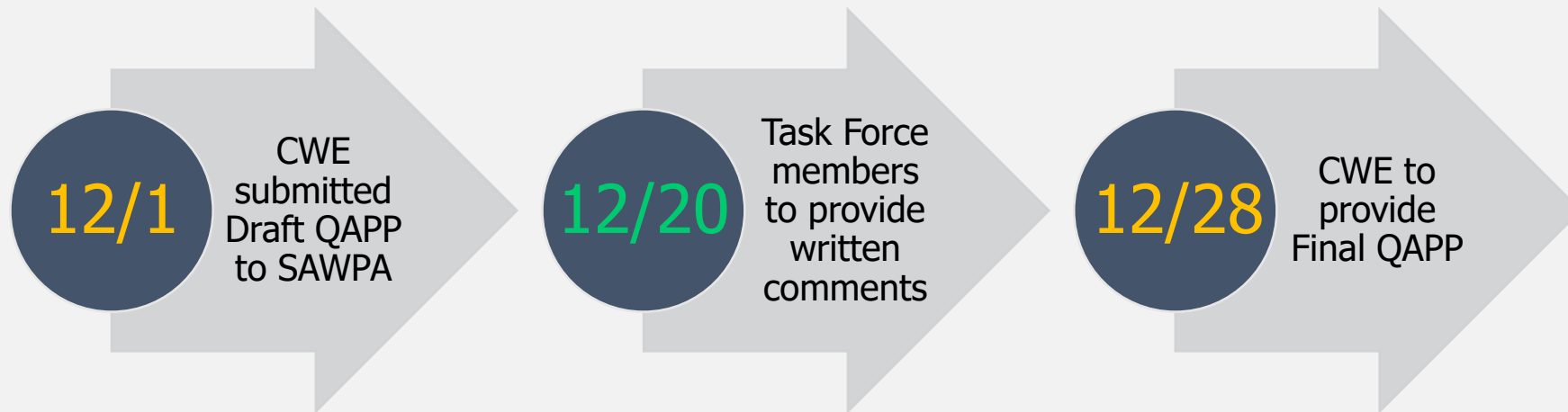
# Data Validation and Usability

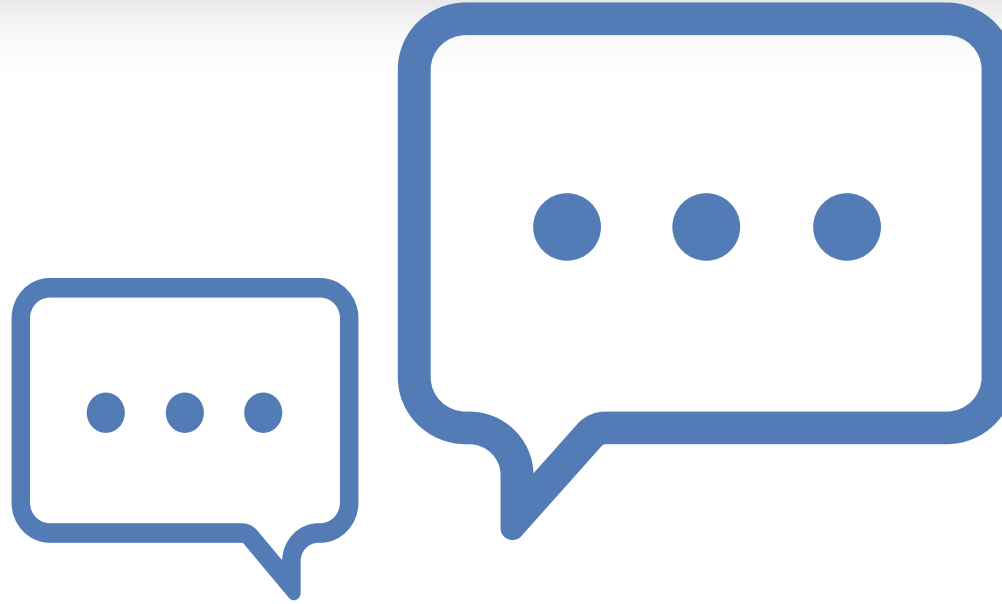
- Data Review Verification and Validation
- Verification and Validation Methods
- Reconciliation with User Requirements



# Schedule

---





Q&A



Creating a Better Tomorrow, **TODAY**™