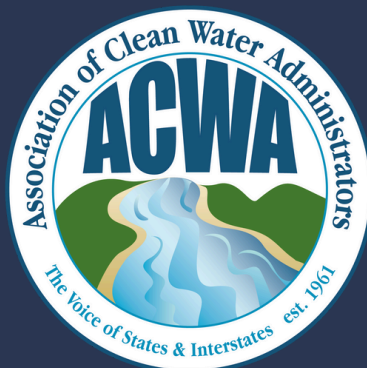


ASSOCIATION OF  
CLEAN WATER \_\_\_\_\_  
ADMINISTRATORS

# 2024 WATER QUALITY MODELING WORKSHOP

September 16 - 20, 2024  
Philadelphia, PA





# TABLE OF CONTENTS

<b>Travel Logistics</b>	<b>3</b>
<b>Restaurant Recommendations</b>	<b>4</b>
<b>Modeling 201: Demystifying your Modeling Project</b>	<b>5</b>
<b>WASP</b>	<b>10</b>
<b>SWAT+</b>	<b>15</b>
<b>Participant List</b>	<b>20</b>

# TRANSPORTATION AND HOTEL INFORMATION

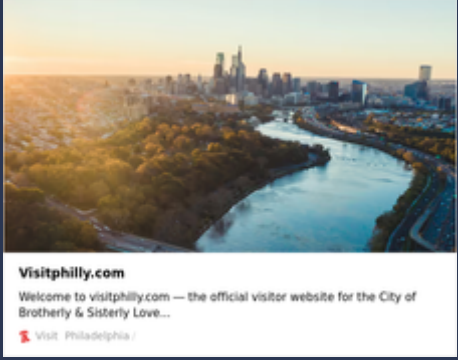
Philadelphia, PA

**Sonesta Philadelphia Rittenhouse Square**  
**1800 Market Street**  
**Philadelphia, Pennsylvania 19103**

Philadelphia Airport (PHL), USA → 1800 Market St, Philadelphia, ...

### 6 ways to travel to 1800 Market Street

<b>1 Philadelphia Airport (PHL), USA</b>	
<b>Train</b> 29min	<b>BEST</b> US\$5-7 >
<b>Taxi</b> 15min	<b>FASTEST</b> US\$40-50 >
<b>Drive 8.7 miles</b> 15min	<b>CHEAPEST</b> US\$2-3 >
<b>Line 37 bus</b> 1h 15min	US\$6 >
<b>Towncar</b> 15min	US\$90-130 >
<b>Shuttle</b> 15min	US\$40-60 >



# RESTAURANT RECOMMENDATIONS

## BREAKFAST & CAFES

## PROXIMITY TO SONESTA PHILADELPHIA RITTENHOUSE SQUARE

<b>ELIXR COFFEE ROASTERS</b>	<b>0.2 MI</b>
<b>KISMET BAGELS</b>	<b>0.2 MI</b>
<b>K'FAR</b>	<b>0.2 MI</b>
<b>VERNICK COFFEE BAR</b>	<b>0.2 MI</b>
<b>LA COLOMBE</b>	<b>0.3 MI</b>
<b>ULTIMO COFFEE</b>	<b>0.4 MI</b>

## LUNCH & DINNER

## PROXIMITY TO SONESTA PHILADELPHIA RITTENHOUSE SQUARE

<b>DIBRUNO BROS</b>	<b>0.1 MI</b>
<b>GRAN CAFFE L'AQUILA</b>	<b>0.1 MI</b>
<b>PIETRO'S</b>	<b>0.2 MI</b>
<b>DIZENGOFF</b>	<b>0.3 MI</b>
<b>GOLDIE</b>	<b>0.3 MI</b>
<b>BANH</b>	<b>0.4 MI</b>
<b>READING TERMINAL MARKET</b>	<b>0.7 MI</b>
<b>THE DANDELION</b>	<b>0.1 MI</b>
<b>EL REY</b>	<b>0.3 MI</b>
<b>HARP &amp; CROWN</b>	<b>0.3 MI</b>

# 2024 Water Quality Modeling Workshop

## LOGISTICS

**September 16-20, 2024**

**Sonesta Philadelphia Rittenhouse Square**

1800 Market St,  
Philadelphia, PA 19103

## SCHEDULE

**Monday:** Full Group Plenary

**Tuesday:** Breakout Sessions

**Wednesday:** Breakout Sessions

**Thursday:** Breakout Sessions

**Friday:** Breakout Sessions and Wrap-Up

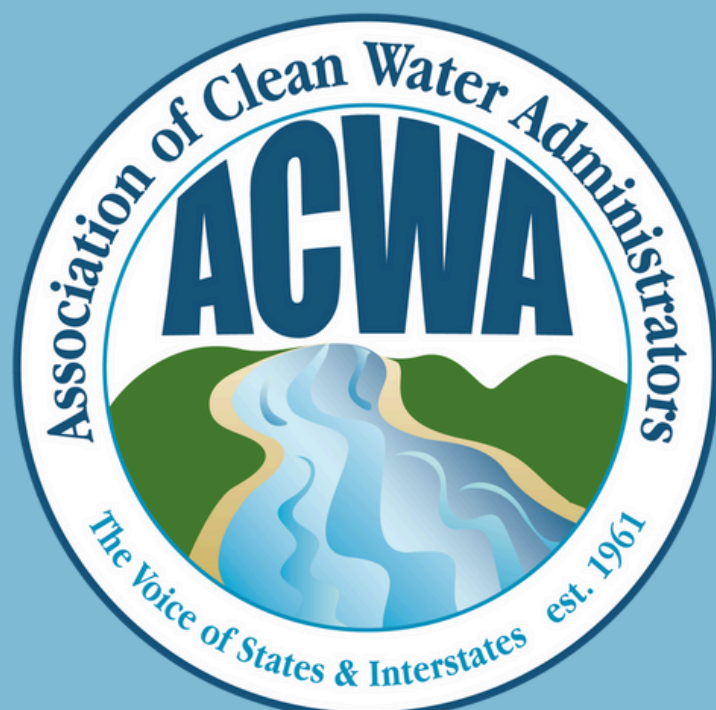
## INSTRUCTORS

This track will be led by EPA and State staff.

## Modeling 201: Demystifying your Modeling Project

The workshop will focus on the following topics:

- Types of projects requiring models
- Project planning overview
- Contracting: SOW, deliverables
- QAPPs
- Data gathering (common sources, spatial and temporal resolution for different types of models)
- Model Configuration
- Model Evaluation
- Model Acceptance
- Model Report
- Public Process
- Defensibility



# MONDAY, SEPTEMBER 16

12:00 – 1:00 PM ET	Welcome and Registration
1:00 – 5:00 PM ET	Full Group Plenary
3:30– 3:45 PM ET	Break

# TUESDAY, SEPTEMBER 17

9:00 – 9:30 AM ET	Introductions and attendee interests Overview of the week, review of prerequisites
9:30 – 10:15 AM ET	Modeling 101 (Lightening presentation and questions)
10:15 – 10:30 AM ET	Break
10:30 – 11:00 AM ET	Project Planning - Project planning overview - Types of projects requiring models - Contracting: SOW, deliverables * Real world example: Introduction to example WA project
11:00 – 12:00 PM ET	QAPPs - Problem formulation - Model selection - Model scoping *Interactive: QAPP investigation
12:00 – 1:15 PM ET	Lunch (on your own)
1:15 – 2:00 PM ET	Introduction to QUAL2Kw  *Interactive: Guided Walk through the example model
2:00–3:30 PM ET	- Data Compilation - Common sources, spatial and temporal resolution for model types) - Data systems - Incorporating data into model - Addressing data gaps *Interactive: Comparing data and model needs (steady state vs. dynamic)
3:30 – 3:45 PM ET	Break
3:45 – 5:00 PM ET	Full Group Plenary  <i>Utilizing SWAT+ for TMDL Characterization: A Wisconsin Case Study</i> Eric Hettler, Wisconsin DNR

6:00 – 8:00 PM ET

### Informal Networking Event

Victory Brewing Company - 1776 Benjamin Franklin Pkwy, Philadelphia, PA 19103

## WEDNESDAY, SEPTEMBER 18

9:00 – 9:30 AM ET

Recap and questions from Tuesday

9:30 – 10:15 AM ET

### Model Configuration

- Channel representation
- Grid resolution and extent
- Boundary conditions
- Parameters

10:15 – 10:30 AM ET

Break

10:30 – 11:30 AM ET

Interactive: QUAL2Kw model setup

11:30 – 12:00 PM ET

### Model Calibration and Evaluation (Part 1)

- Selecting parameters to calibrate
- Process and evaluation
- Sensitivity analyses

12:00 – 1:15 PM ET

Lunch (on your own)

1:15 – 2:00 PM ET

### Model Calibration and Evaluation (Part 2)

- Post-processing and visualization
- Quantitative vs. qualitative examples
- Error statistics

2:00 – 3:30 PM ET

\*Interactive: Work through QUAL2Kw calibration

\*Interactive: Post-processing, visualization, and error statistics

3:30 – 3:45 PM ET

Break

3:45 – 5:00 PM ET

Full Group Plenary

### *Chesapeake Climate Change Assessment Using A Suite of Atmospheric, Land Use, Watershed, and Estuarine Models*

Lewis Linker, U.S. EPA Chesapeake Bay Program Office

6:00 – 8:00 PM ET

### Informal Networking Event

City Tap House - 100 N 18th St, Philadelphia, PA 19103

## THURSDAY, SEPTEMBER 19

9:00 – 9:30 AM ET

Recap and questions from Tuesday/Wednesday

9:30 – 10:00 AM ET

### Model Acceptance

- Acceptance process
- Marking acceptance

10:00 – 10:30 AM ET

Model Report  
- QAPPs and modeling reports  
- Contents  
- Review components

10:30 – 10:45 AM ET

Break

10:45 – 12:00 PM ET

Interactive: Guided tour through modeling report  
Breakouts: Identify questions or issues with modeling report

12:00 – 1:15 PM ET

Lunch (on your own)

1:15 – 3:30 PM ET

Scenarios and decision making  
\*Interactive: Review example project scenarios; Create your own QUAL2Kw scenarios

3:30 – 3:45 PM ET

Break

3:45 – 5:00 PM ET

Full Group Plenary  
  
Leveraging Nutrient Inventories to Inform Water Quality Modeling and Restoration Effort  
Robert Sabo, U.S. EPA

## FRIDAY, SEPTEMBER 20

9:00 – 9:45 AM ET

- Public Process  
- Modeling Defensibility and communication

9:45 – 10:45 AM ET

- Recap and questions from the week  
- Wrap-up and resources

10:45 – 11:00 AM ET

Break

11:00 – 12:00 PM ET

Workshop Wrap-Up



# 2024 Water Quality Modeling Workshop

## LOGISTICS

**September 16-20, 2024**

Sonesta Philadelphia Rittenhouse Square

1800 Market St,  
Philadelphia, PA 19103

## SCHEDULE

**Monday:** Full Group Plenary

**Tuesday:** Breakout Sessions and Debrief

**Wednesday:** Breakout Sessions and Debrief

**Thursday:** Breakout Sessions and Debrief

**Friday:** Breakout Sessions and Wrap-Up

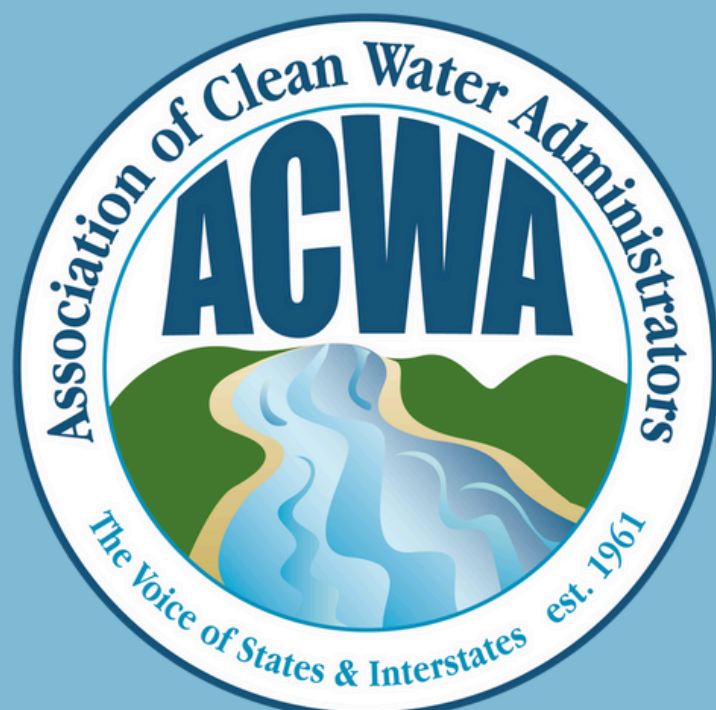
## INSTRUCTORS

Trainings will be provided by Tetra Tech contractors.

## WASP

The workshop will focus on the following topics:

- Model Network/Segmentation
- Segmentation examples (CSTR, 1-D River, 2D-Lateral River, Hydrodynamic Linkage)
- WASP Transport Schemes (Flow Routing, Kinematic Wave, Dynamic Flow, Lake Module, Hydrodynamic Linkage)
- Modeling Temperature, Introduction of Boundaries and Kinetic Constants
- Dissolved Oxygen, Nutrient Cycling, Algae Growth, Periphyton/Macro Algae
- Introduction to Toxicant Model
- Nutrient Reduction to meet Water Quality Standard/Endpoint
- Model Calibration



## MONDAY, SEPTEMBER 16

12:00 – 1:00 PM ET	Welcome and Registration
1:00 – 5:00 PM ET	Full Group Plenary
3:30– 3:45 PM ET	Break

## TUESDAY, SEPTEMBER 17

8:00 – 8:30 AM ET	Welcome, Introductions, Why Model
8:30 – 9:00 AM ET	Introduction to WASP
9:00 – 9:30 AM ET	Model Network/Segmentation
9:30 – 10:30 AM ET	Computer Example Segmentation examples (CSTR, 1-D River, 2D-Lateral River, Hydrodynamic Linkage)
10:30—10:45 AM ET	Break
10:45—12:00 PM ET	WASP Transport Schemes (Flow Routing, Kinematic Wave, Dynamic Flow, Lake Module, Hydrodynamic Linkage)
12:00 – 1:15 PM ET	Lunch (on your own)
1:15 – 2:00 PM ET	Computer Examples Transport Schemes
2:00—2:15 PM ET	Break
2:15 – 3:45 PM ET	Computer Example: Modeling Temperature, Introduction of Boundaries and Kinetic Constants
4:00 – 5:00 PM ET	Full Group Plenary <i>Utilizing SWAT+ for TMDL Characterization: A Wisconsin Case Study</i> Eric Hettler, Wisconsin DNR
6:00 – 8:00 PM ET	Informal Networking Event  Victory Brewing Company - 1776 Benjamin Franklin Pkwy, Philadelphia, PA 19103

## WEDNESDAY, SEPTEMBER 18

8:00 – 8:30 AM ET	Introduction to Eutrophication Module
8:30 – 9:00 AM ET	Environmental Conditions

9:00 – 9:30 AM ET	Applying Varying Model Complexity
9:30 – 10:30 AM ET	Setting Up WASP Input. Data requirement, how to organize, and enter into model
10:30—10:45 AM ET	Break
10:45—12:00 PM ET	Computer Examples: 1) Dissolved Oxygen 2) Nutrient Cycling 3) Algae Growth 4) Periphyton/Macro Algae
12:00 – 1:15 PM ET	Lunch (on your own)
1:15 – 2:00 PM ET	Computer Examples (Continued)
2:00—2:15 PM ET	Break
2:15 – 3:45 PM ET	Computer Example: Real World Model Example
4:00 – 5:00 PM ET	Full Group Plenary  <i>Chesapeake Climate Change Assessment Using A Suite of Atmospheric, Land Use, Watershed, and Estuarine Models</i> Lewis Linker, U.S. EPA Chesapeake Bay Program Office
6:00 – 8:00 PM ET	Informal Networking Event  City Tap House - 100 N 18th St, Philadelphia, PA 19103

## THURSDAY, SEPTEMBER 19

8:00 – 8:30 AM ET	Model Calibration Process, Visualization Tools
8:30 – 9:00 AM ET	How to do a TMDL and/or Waste Load Allocation
9:00 – 9:30 AM ET	Computer Example: Model Calibration
9:30 – 10:30 AM ET	Computer Example: Nutrient Reduction to meet Water Quality Standard/Endpoint
10:30—10:45 AM ET	Break
10:45—12:00 PM ET	Introduction to Toxicant Model
12:00 – 1:15 PM ET	Lunch (on your own)
1:15 – 2:00 PM ET	Computer Examples
2:00—2:15 PM ET	Break
2:15 – 3:45 PM ET	Computer Examples (Continued)
4:00 – 5:00 PM ET	Full Group Plenary  Leveraging Nutrient Inventories to Inform Water Quality Modeling and Restoration Effort Robert Sabo, U.S. EPA

# FRIDAY, SEPTEMBER 20

8:00 – 10:30 AM ET

Scenarios and Q&A

10:30—11:00 AM ET

Break

11:00 – 12:00 PM ET

Workshop Wrap-Up

# 2024 Water Quality Modeling Workshop

## LOGISTICS

**September 16-20, 2024**

Sonesta Philadelphia Rittenhouse Square

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Philadelphia, PA 19103

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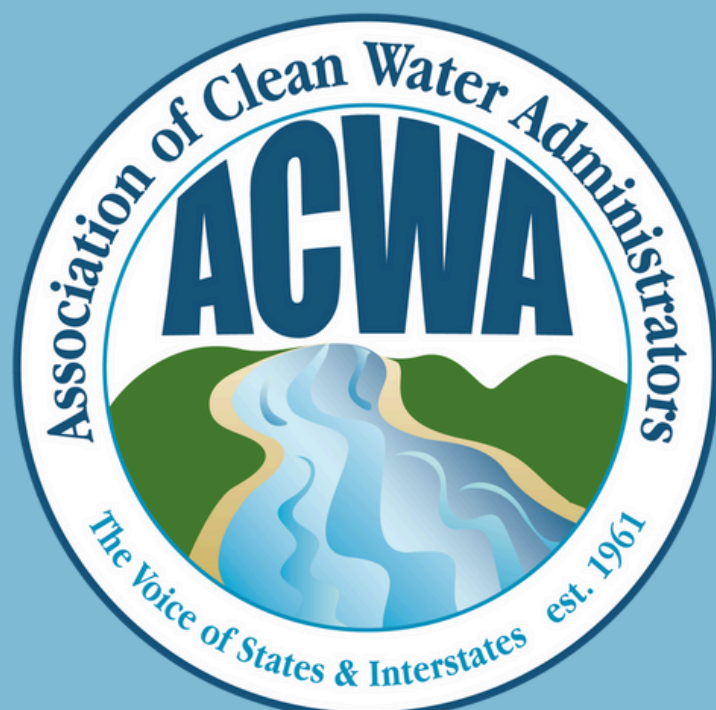
## INSTRUCTORS

Training will be provided by TetraTech contractors.

## SWAT+

This track will focus on the following topics:

- Hands-on QSWAT+ watershed delineation
- SWAT+ Editor session using the QSWAT+ project developed and model execution, reading the results, saving projects
- SWAT+ Editor session, visualization, running scenarios, and Q&A session
- SWAT+ soft calibration
- SWAT+ Toolbox Overview
- Setting up projects
- Running SWAT+
- Parameters
- Observations
- Running Sensitivity Analysis
- Model Calibration
- Model Checks
- Management Operations
- Running Scenarios



## MONDAY, SEPTEMBER 16

1:00 – 5:00 PM ET

Full Group Plenary

3:00– 3:30 PM ET

Break

## TUESDAY, SEPTEMBER 17

9:00 – 10:30 AM ET

Welcome and Introduction, Theory and Conceptual SWAT+ model

10:30 – 10:45 AM ET

Break

10:45 – 12:00 PM ET

Hands-on QSWAT+ watershed delineation

12:00 – 1:00 PM ET

Lunch (on your own)

1:00 – 3:30 PM ET

Hands-on QSWAT+ watershed delineation

3:30–4:00 PM ET

Break

4:00 – 5:00 PM ET

Full Group Plenary

*Utilizing SWAT+ for TMDL Characterization: A Wisconsin Case Study*

Eric Hettler, Wisconsin DNR

6:00 – 8:00 PM ET

Informal Networking Event

Victory Brewing Company - 1776 Benjamin Franklin Pkwy, Philadelphia, PA 19103

## WEDNESDAY, SEPTEMBER 18

9:00 – 10:30 AM ET

SWAT+ Editor session using the QSWAT+ project developed and model execution, reading the results, saving projects

10:30 – 10:45 AM ET

Break

10:45 – 12:00 PM ET

SWAT+ Editor session, visualization, running scenarios, and Q&A session

12:00 – 1:00 PM ET

Lunch (on your own)

1:00 – 3:00 PM ET

SWAT+ soft calibration

3:10–3:30 PM ET

Presentation on Model Calibration and Evaluation

3:30–4:00 PM ET

Introduction to the case study dataset

Break

4:00 – 5:00 PM ET

**Full Group Plenary**

*Chesapeake Climate Change Assessment Using A Suite of Atmospheric, Land Use, Watershed, and Estuarine Models*

Lewis Linker, U.S. EPA Chesapeake Bay Program Office

6:00 – 8:00 PM ET

**Informal Networking Event**

City Tap House - 100 N 18th St, Philadelphia, PA 19103

## **THURSDAY, SEPTEMBER 19**

9:00 – 10:30 AM ET

**1. SWAT+ Toolbox Overview**

**2. Setting up projects**

- Creating new projects
- Opening existing projects

**3. Running SWAT+**

- Model run setting
- Model run scenarios

**4. Parameters**

- Adding parameters (Individual vs Sets)
- Parameter change types
- Attaching objects to parameters

10:30 – 10:40 AM ET

**Break**

10:40 – 12:00 PM ET

**5. Observations**

- Preparing observations
- Adding observations

**6. Running Sensitivity Analysis**

- Understanding sensitivity analysis
- Setting up sensitivity analysis run
- Interpreting results

12:00 – 1:00 PM ET

**Lunch (on your own)**

1:00 – 2:50 PM ET

**7. Model Calibrations**

- Manual calibrations
- Automatic calibrations

**8. Model Checks**

- Water balance
- Nutrient balance
- Sediments

**9. Management Operations**

- Management schedules
- Dealing with decision tables

2:50 – 3:00 PM ET

**Break**

3:00—3:30 PM ET

10. Running Scenarios  
- Climate change  
- Land Management ‘Scenarios’

11. Q&A

3:30—4:00 PM ET

Break

4:00 – 5:00 PM ET

Full Group Plenary

Leveraging Nutrient Inventories to Inform Water Quality Modeling and  
Restoration Effort

Robert Sabo, U.S. EPA

## FRIDAY, SEPTEMBER 20

9:00 – 11:00 AM ET

Scenarios and Q&A

11:00 – 12:00 PM ET

Workshop Wrap-Up



## ACWA 2024 Water Quality Modeling Workshop – Participant List

First Name	Last Name	Title	Organization Name	Email
Hayden	Willis	Environmental Engineering Specialist	Alabama Department of Environmental Management	hayden.willis@adem.alabama.gov
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## ACWA 2024 Water Quality Modeling Workshop – Participant List

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## ACWA 2024 Water Quality Modeling Workshop – Participant List

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## ACWA 2024 Water Quality Modeling Workshop – Participant List

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## ACWA 2024 Water Quality Modeling Workshop – Participant List

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John	Johnston	Supervisory Ecologist	United States Environmental Protection Agency Headquarters	johnston.johnm@epa.gov
Rosaura	Conde	Biologist	United States Environmental Protection Agency Headquarters	Conde.Rosaura@epa.gov
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Kathryn	Carberry	TMDL/NPS Coordinator	United States Environmental Protection Agency, Region 10	carberry.kathryn@epa.gov
Ben	Cope	Environmental Engineer	United States Environmental Protection Agency, Region 10	cope.ben@epa.gov
Melissa	Duvall	Physical Scientist	United States Environmental Protection Agency, Region 2	duvall.melissa@epa.gov

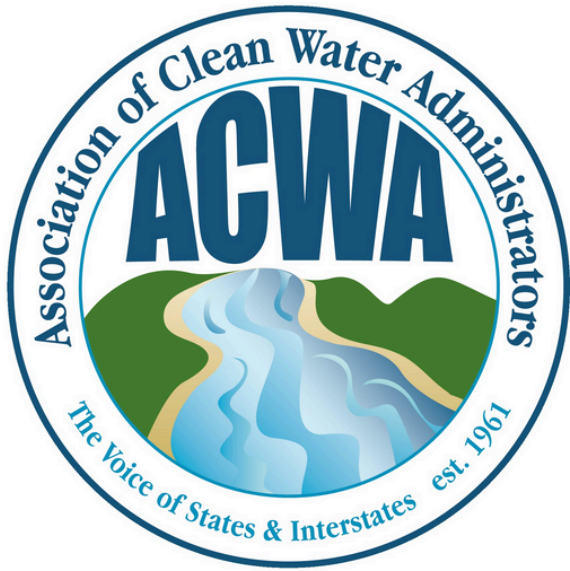
## ACWA 2024 Water Quality Modeling Workshop – Participant List

Antony	Tseng	Environmental Engineer	United States Environmental Protection Agency, Region 2	Tseng.Antony@epa.gov
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## ACWA 2024 Water Quality Modeling Workshop – Participant List

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Amy	King	Life Scientist	United States Environmental Protection Agency, Region 8	king.amy@epa.gov
Jason	Gildea	Water Policy Advisor	United States Environmental Protection Agency, Region 8	gildea.jason@epa.gov
Nicholas	von Stackelberg	Environmental Engineer	Utah Department of Environmental Quality	nvonstackelberg@utah.gov
Craig	Lott	TMDL Modeling Coordinator	Virginia Department of Environmental Quality	Craig.Lott@DEQ.Virginia.gov
Eric	Hettler	Water Quality Modeler	Wisconsin Department of Natural Resources	eric.hettler@wisconsin.gov

- List updated as of 9/9/24
- If any of your information needs to be updated, please contact Lexy Bailey (abailey@acwa-us.org)



**Thank you to the planning  
committee and our partners at  
EPA!**

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WASHINGTON, DC 20006

(202) 756 - 0605

[WWW.ACWA-US.ORG](http://WWW.ACWA-US.ORG)

@cleanwaterACWA