NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION WATER MONITORING AND STANDARDS

BUREAU OF FRESHWATER AND BIOLOGICAL MONITORING P.O. Box 420; TRENTON, NEW JERSEY 08625

QUALITY ASSURANCE PROJECT PLAN

National Water Quality Initiative (NWQI), Upper Salem River Watershed Monitoring, Years 9-10, 2023-2024

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Table of Contents

1 1	D 9		TAT .	
1.0	Proj	IPCT	N a	me
1.0	110	CCL	1 14	

- 2.0 Requesting Agencies
- 3.0 Date of Project
- 4.0 Project Fiscal Information
- 5.0 Project Oversight
- **6.0** Special Training Needs/Certification
- 7.0 Project Description/Objective
- 8.0 Data Usage
- 9.0 Monitoring Design/Site Selection
- 10.0 Parameters and Sampling Procedures
- 11.0 Data Quality/Quality Control Requirements
- 12.0 Resource Needs
- 13.0 Sampling Frequency and Schedule
- 14.0 Quality Assurance
- 15.0 Data Analysis
- 16.0 Data Validation
- 17.0 Performance System Audits
- 18.0 Data Storage and Distribution
- 19.0 Data Reporting
- **20.0** Corrective Action
- 21.0 References

Attachments:

Appendix A

Table 1 Site Locations

Table 2 Field Parameters

Table 3 Chemical Parameters

Table 4 Laboratory Worksheet

Appendix B Map of Sampling Sites

Appendix C NJDOH Laboratory Submittal/Chain-of-Custody Form (Chem 44)

- **1.0 Project Name:** National Water Quality Initiative (NWQI), Upper Salem River Watershed Monitoring, Years 9-10, 2023-2024
- **2.0 Requesting Agencies:** The United States Environmental Protection Agency (USEPA) and The United States Department of Agriculture's (USDA) National Resources Conservation Service (NRCS)
- 3.0 Date of Project: July-November 2023, July-November 2024
- **4.0 Project Fiscal Information:** 35950000, with staff salaries funded via PPA and analytical costs and supplies funded via CBT

5.0 Project Oversight:

Project Officer: Ismail Sukkar, NJDEP-BFBM, Ismail.Sukkar@dep.nj.gov
Project Supervisor: Dean Bryson, NJDEP-BFBM, Dean.Bryson@dep.nj.gov

Quality Assurance Officer: Jenna Majchrzak, NJDEP-OQA, Jenna.Majchrzak@dep.nj.gov

6.0 Special Training Needs/Certification

All personnel assisting with field sampling for this project will be trained on all applicable methods and techniques, including sample collection, handling, and documentation. Sample collection and handling will conform to the "NJDEP Field Sampling Procedures Manual" (2005 or 2022 edition, as available) and the requirements of the respective analytical method. For physical/ chemical analysis, the training will entail calibration of meters, deployment techniques, and data retrieval from the equipment. The Project Officer or designee will be responsible for any necessary training.

Safety training and safety requirements will comply with Bureau of Freshwater and Biological Monitoring Field Work Health and Safety Plan (HASP) Version #2, August 2019.

BFBM is certified by the NJDEP-Office of Quality Assurance (certified lab ID # 11896) for all analyze-immediately parameters to be measured.

The New Jersey Department of Health (NJDOH) Public Health and Environmental Laboratories (#11036), West Trenton, NJ, will be utilized for the analysis of all other parameters. The NJDOH laboratory is certified by NJDEP-OQA for the requested parameters and methods.

7.0 Project Description/Objective

The National Water Quality Initiative (NWQI) is a partnership among USDA's National Resources Conservation Service (NRCS), USEPA, and state water quality water quality agencies. The NRCS provides targeted financial and technical assistance to farmers and ranchers throughout the Nation in small watersheds most in need, and where farmers can use conservation practices to make a difference. Conservation practices aimed at reducing water quality impacts from agricultural lands include measures to promote soil health, reduce

erosion, and lessen nutrient runoff. Initially, three watersheds (HUC12s) were selected in New Jersey to receive this funding. With USEPA guidance, one of these watersheds, the Upper Salem River, was selected to receive focused monitoring, conducted by NJDEP-BFBM, to assess the effectiveness of these conservation practices in the watershed. Many nonpoint source management measures can take years to become fully effective, defined as lag time. Therefore, this monitoring has been ongoing and expected to continue. The monitoring design will be evaluated annually, and a new QAPP prepared every two years, as needed, to ensure the effectiveness of conservation practices is being measured adequately. This QAPP is for Years 9-10 of the monitoring, which began in 2015.

8.0 Data Usage

Water quality data obtained will be used by NJDEP and NRCS to assess whether water quality related to nutrients and sediment has changed in the watershed, and if so, can the changes be associated with implemented agricultural conservation practices (Best Management Practices, BMPs).

9.0 Monitoring Design/Site Selection

The 2023 sampling sites are based on conservation practice data recently provided by NRCS. The sampling sites provide coverage of the overall Salem River watershed, and coverage of tributaries with higher density of practices, addressing nutrient and sediment impacts. Additional information about site locations, such as coordinates, location maps, etc. can be found in Appendix A and Appendix B.

01482455, Salem River @ Pole Tavern Rd. (Rt. 77), Upper Pittsgrove Twp. AN0690, Salem River @ Rt. 581 (Commissioner's Road), Upper Pittsgrove Twp. AN0693, Salem River @ Kings Highway, Pilesgrove Twp. BA70, Salem River @ Courses Landing, Mannington Twp. AN0694, Major Run @ Pointers-Auburn Rd, Mannington Twp. BFBM000343, UNT to Salem River @ Courses Landing Rd., Mannington Twp.

AN0694 and BFBM000343 were added in 2022. BA70 was added in 2020 to provide a broader assessment of the entire watershed at HUC12-scale. The remaining 3 sites-01482455, AN0690, and AN0693 have been monitored since program began in 2015.

All positions were logged into the Geographic Information System (GIS). A hand-held GPS unit will be used to confirm correct locations at the time of sampling.

10.0 Parameters and Sampling Procedures

Physical/Chemical Parameters

All parameters will be collected and/or measured as per requirements and procedures outlined in N.J.A.C. 7:18 (as amended 2018) and NJDEP Field Sampling Procedures Manual (NJDEP, as updated 2022).

Water column samples will be collected as follows:

- o For streams less than 6 feet wide:
 - o A single grab sample will be collected by submerging to mid-depth then brought up to surface and capped in a 500 mL sanitized bottle.
- o For streams greater than 6 feet wide:
 - o A minimum of 3 subsurface grab samples of equal volume will be collected at equidistant points across the stream in a 500 mL sample bottle
 - These grab samples will be composited in a 2-L container/churn
 - The composite sample will be poured into two 500mL sanitized sample bottles for laboratory analysis as specified below.

Nutrient samples (Total Phosphorus, Total Kjeldahl Nitrogen (TKN), and Nitrite-Nitrate) will be collected in one 500 mL sample bottles. Sulfuric acid will be added to preserve the sample in the field to bring pH down to <2, and then the sample will be stored cold (<4°C) until delivery to the analytical laboratory. The bottles shall be labeled via a field ID number which will correspond to the laboratory COC form in Appendix C. Total Suspended Solids (TSS) samples will be collected in one 500 mL sample bottles and will be stored cold (<4°C), with no additional preservative until delivery to the analytical laboratory.

Field readings for analyze-immediately parameters (dissolved oxygen, pH, specific conductivity, water temperature, and turbidity) will be made at each site during each sampling event. BFBM (#11896) is certified by NJDEP's OQA to perform these analyze-immediately parameters. All analyze-immediately measurements will be made mid-depth, mid-stream concurrent with water column sample collection. One set of measurements shall be taken per site, with one random site having a duplicate set of measurements taken. This duplicate should be taken at a slightly different location that is still mid-stream, and be taken 5 minutes after the initial set of measurements.

The 2-L composite bottle used to collect water quality samples for the parameters listed will be cleaned between each use using a 1% solution of lab detergent (Liquinox) and deionized water. All equipment cleaning will be performed at BFBM's preparation laboratory.

Field Precautions for Aquatic Invasives

To prevent the potential spread of nuisance or invasive organisms such as *Didymosphenia* sp. from stream to stream, all nets, waders, etc. will be decontaminated in the field between sites by spraying with an antibacterial spray, such as Fantastik (heavy duty), and rinsing with tap water. Also, the use of felt-soled waders will be avoided.

11.0 Data Quality/Quality Control Requirements

Water temperature, pH, specific conductivity, and dissolved oxygen (DO) will be measured using a YSI ProDSS, or equivalent water quality meter(s). The YSI ProDSS is a multiparameter water quality meter that combines temperature, pH, specific conductivity

turbidity and DO probes into one device that is submersible to the desired depth. All equipment will be calibrated, maintained, and used following manufacturer's instructions and in accordance with the specifications given in the analytical method being followed, as well as N.J.A.C. 7:18 *et. seq.* (NJDEP, as amended September, 2018).

Conductivity (SM 2510 B-11): This probe is calibrated on a weekly basis per the manufacturer recommendations. The probe is also checked each day of use with a certified standard which corresponds to the expected range of the values to be measured. The check standard is required to read within \pm 1% of the true value of the standard prior to using the meter. Records of all calibrations and calibration checks shall be maintained in a bound field logbook, signed and dated by the field technician. Expected range of measurements is 20-6,000 μ S/cm.

Dissolved Oxygen (Hach 10360 - 10/2011 Rev 1.2): A Winkler check is performed on a weekly basis and the meter is barometrically calibrated once on day of use. A calibration check using fully oxygenated water is performed once daily. A 100% oxygen saturated water bath is checked at the beginning and end of day when in use. Records of all calibrations and calibration checks shall be maintained in a bound field logbook, signed and dated by the field technician. Expected range of measurements is 0.20-16.00 mg/L.

pH (SM 4500-H B-11): The probe is calibrated on a daily basis with two certified buffers that bracket the expected range of the value being measured per the manufacturer recommendations. A third certified pH buffer, within the bracket, is then used to check the calibration. After three hours of continuous use, the pH of the third certified buffer will be checked. Records of all calibrations and calibration checks shall be maintained in a bound field logbook, signed and dated by the field technician. Expected range of measurements is 3.0-9.5.

Temperature (SM 2550 B-10): The probe is calibrated with a NIST-certified thermometer on a quarterly basis. Records of the calibration shall be maintained by the BFBM. Expected range of measurements is 1.0-35.0°C.

Turbidity meter (SM 2130 B-11): Hach Model 2100P turbidimeter is calibrated once a month per manufacturer's recommendation. The meter is then checked with certified standards for accuracy within the calibration range during each day of use. The check standard is required to read within \pm 10% of the true value of the standard prior to using the meter. Records of all calibrations and calibration checks shall be maintained in a bound field logbook, signed and dated by the field technician. Expected range of measurement is 0.2-900 NTU.

Chain of Custody

Chain of custody procedures will be followed for all samples submitted to an analytical laboratory. An example of the chain of custody that will be used is attached as Appendix C. The project officer and project supervisor are responsible for sampling and laboratory method validation.

12.0 Resource Needs

BFBM will utilize one full-time and, if necessary, one hourly personnel for collection of the water column samples and field measurements.

13.0 Sampling Frequency and Schedule

The target frequency of physical/chemical monitoring will be 4 times at each site between July 1st and November 30th of both 2023 and 2024 with roughly 4 weeks between sampling events (once per month). This results in a total of 8 planned sampling events.

The sampling for this project in the Salem River watershed is tentatively expected to be completed in 2024, with any requested reports and analysis completed by April 2025.

14.0 Quality Assurance

Laboratory Analysis

The NJDOH laboratory will perform the following analyses:

Parameter	Laboratory	Method	Reporting Level (mg/L)	Holding Time	Preservative
Nitrite + Nitrate	NJDOH	SM 4500- NO3-F-16	0.012	28 days	pH<2, Ice to 4°C
TKN	NJDOH	EPA 351.2	0.100	•	
Total Phosphorus	NJDOH	EPA 365.1	0.010	28 days	pH<2, Ice to 4°C
TSS	NJDOH	SM 2540-D- 15	1.0	7 days	Ice to <6°C

Sample Containers

Sample containers shall be dedicated, single-use plastic bottles provided by NJDOH to provide the required volume for each analysis.

Chain of Custody

Chain of Custody (COC) forms are required for all samples submitted to the New Jersey Department of Health (NJDOH) laboratory. Please refer to Appendix C.

15.0 Data Analysis

Physical/ Chemical

All samples will be analyzed by New Jersey Department of Health (NJDOH) laboratory for the requested parameters. The reporting levels listed in Section 14.0 are required for this project.

16.0 Data Validation

The Project Officer is responsible for data validation. If apparent anomalous data is suspected, the Project Officer will review the sampling procedures with the field sampler to make sure the proper collection and preservation procedures were followed. If the data is still suspect, an internal review of the laboratory procedures and/or calculations used in the analysis of the suspect sample, with special emphasis on transcription of data to assure that no transposition of figures occurred will be conducted. If no problems are found in the laboratory procedures, the data may then be compared to any historical data that might have been collected at the same site prior to the most recent sampling event to see if similar anomalies might have been found previously. The suspect data may also be compared to literature values or standard analytical treatises to verify whether the results are within the limits of accuracy of the test method.

If no obvious problems are found after these reviews, the complete data set will be reported with the suspect data identified as it relates to the objectives(s) and data accuracy required in this project.

17.0 Performance System Audits

BFBM is subject to audits and guidelines of the NJDEP-OQA's Laboratory Certification Program as well as internal performance evaluations.

The Office of Quality Assurance (OQA) may request the sampling schedule at any point during this project in order for an audit to be performed.

18.0 Data Storage and Distribution

All field measurements will be recorded in a field logbook and transferred into a Microsoft Access database, along with site location, date, time, and sampler's name.

Following validation by the project officer, all data and results will be uploaded by BFBM into USEPA's Water Quality Exchange (WQX) by June of the year following validation.

All raw data records shall be maintained for a period of no less than five years.

19.0 Data Reporting

Updates will be provided to NRCS and USEPA's National Nonpoint Source Program in the month of April of each year. If requested, a final report shall be submitted to NRCS and USEPA at the conclusion of the project. Data being collected for this project will not be used for regulatory purposes.

20.0 Corrective Action

The Project Officer will be responsible for the oversight of all activities related to this

project. The Project Officer will assess field collection functions and make corrections when necessary to maintain the data accuracy as defined in this plan. If any changes or modifications are made to this plan regarding data collection, as it relates to the objective(s) and data accuracy required in this project, all original signees of the QAPP will be notified. If the modifications result in significant changes to the plan, the QAPP will be re-approved by all original signees.

21.0 References

NJDEP, updated 2022. Field sampling procedures manual. NJDEP, Trenton, NJ.

NJDEP, amended 2018. <u>Regulations governing the certification of laboratories and environmental measurements</u>. N.J.A.C. 7:18. NJDEP. Trenton, NJ.

Appendix A

Table 1 Site Locations

Station ID	Waterbody/Location	Latitude-dd	Longitude-dd	County
01482455	Salem River @ Pole Tavern Rd. (Rt. 77)	39.60261294	-75.2376872	Salem
AN0690	Salem River @ Rt. 581 (Commissioner's Road)	39.62158086	-75.2682052	Salem
BA70	Salem River @ Courses Landing	39.66100	-75.40940	Salem
AN0693	Salem River @ Kings Highway	39.65275957	-75.3680551	Salem
AN0694	Major Run @ Kings Highway	39.64868969 5	-75.3742748	Salem
BFBM000343	UNT to Salem River @ Courses Landing Rd.	39.6649443	-75.4075462	Salem

Table 2 Field Parameters

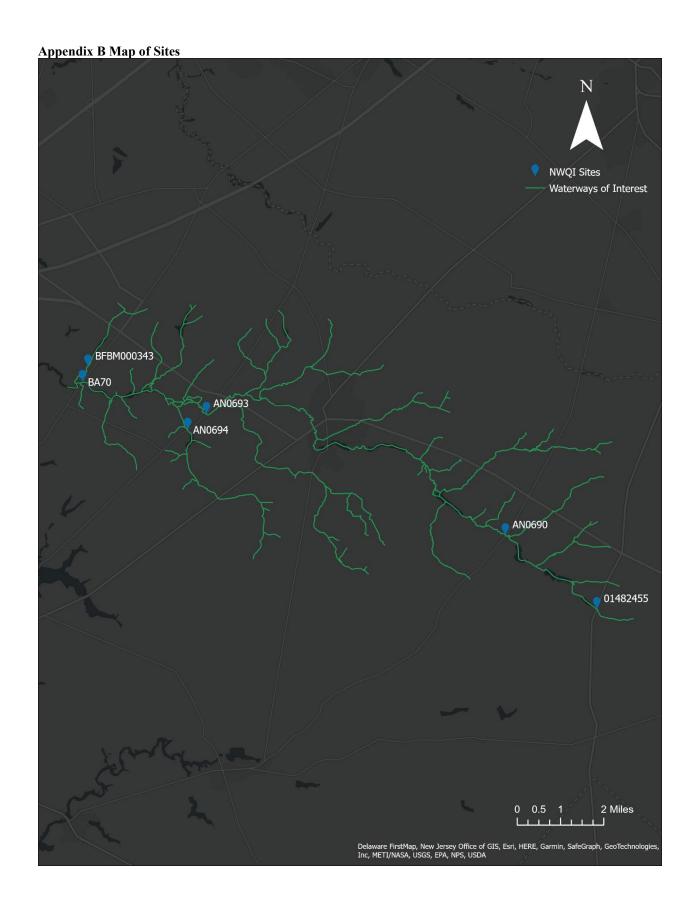
Field Name	WQDE Name	Media	Units
DO	Dissolved oxygen (DO)	Water	mg/l
Water Temp	Temperature, Water	Water	°C
Spec Cond	Specific conductance	Water	μS/cm
рН	рН	Water	None
Turbidity	Turbidity	Water	NTU

Table 3 Chemical Parameters (Analyzed by the NJDOH)

Analysis (lab name)	EPA Characteristic Name	Method Speciation Name	Result Sample Fraction	Result Measure Unit	Result Value Type	Sample Collection Type	Sample Collection Equipment	
Nitrite + Nitrate as N	l nitrogen l		Total	mg/l	Actual	Grab	Water Sampler (Other)	
Total Kjeldahl Nitrogen	Kjeldahl nitrogen	as N	Total	mg/l	Actual	Grab	Water Sampler (Other)	
Total Phosphorus	Total Phosphorus	As P	Total	mg/l	Actual	Grab	Water Sampler (Other)	
TSS	Total suspended solids		Total	mg/l	Actual	Grab	Water Sampler (Other)	

Table 4 Laboratory Worksheet

Parameter	Laboratory	Lab Number	Method	Method ID Context	Lower Reporting Limit	units	Method Detection Limit	units	Upper Reporting Limit	units	Holding Time	Preservative
Nitrite + Nitrate	NJDOH	11036	4500- NO3(F)- 16	SM	0.012	mg/l	0.007	mg/l			28 days	pH<2, Ice to 4°C
TKN	NJDOH	11036	351.2	USEPA	0.1	mg/l	0.041	mg/l			28 days	pH<2, Ice to 4°C
Total Phosphorus	NJDOH	11036	365.1	USEPA	0.01	mg/l	0.007	mg/l			28 days	pH<2, Ice to 4°C
TSS	NJDOH	11036	2540-D- 15	SM	1.0	mg/l	1.0	mg/l			7 days	Ice to <6 °C



Appendix C NJDOH Laboratory Sample Submittal/Chain-of-Custody Form (Chem 44)

Field ID Number	New Jersey Department of Health Environmental and Chemical Laboratory Services PO Box 361, Trenton, NJ 08625-0361 Phone: 609-530-2820 ORGANIC AND INORGANIC CHEMISTRY SAMPLE SUBMITTAL (See Instructions)							
		AGENCY IN	FORMATION	37.33.212.39				
Submitting Agency NJDEP-BFBM	Send Resu NJDEP-BF		Agency No.		Project Name NWQI-Salem			
Street Address	Final Repo		Would you like copies of	of the internal	Project Code			
	☐ Tier 1		chain of custody forms		NWQI23			
35 Arctic Parkway	☐ EDD	Report Option □ E-2	your report? Yes No		Memo Number			
City, State, Zip Code Trenton, NJ 08625	Phone 609	9-292-0427	Fax 609-633-1095		ismail.sukkar@dep.nj.gov			
Sample Point/Station ID Number/Water	Eacility ID	SAMPLE INI Collection Date (YY/MM/D	FORMATION		Sample Type			
Sample PolitiStation ID Number/Water	r acility ID	/ /	<i>(</i> 10)	Non-Potab	ole:			
Sampling Site/Facility/Supply/Location/Sa	mpling Point ID	Coll. Time (24h) Start	Coll. Time (24h) End	─ Stream/ ☐ Ground				
Waterbody Name		Comple Potenties		☐ Private \	Well ☐ Raw ☐ Effluent			
Waterbody Name		Sample Retention Retain? No Yes	es Duration	☐ Septic ☐ Ocean/S	☐ Industrial: Saline ☐ Raw ☐ Effluent			
Municipality/County		Type of Sampling Event		☐ Sedime				
		■ Regular	npliance	Potable:	water Rule			
Sampling Point Street Address		☐ Non-Regulatory If Repeat or GWR, List Or	Other	☐ Sour	rce			
			.gai Lub Gampie 110.	☐ Raw	☐ Lead Source Line			
*		Sample Collector	х.	☐ Finished	d ☐ Surface H₂O Intake Well ☐ Distribution System			
PWSID		Trip#			Fraction:			
			ORMATION					
Air Temp °C		Water Temp °C		Stream Flow-CFS				
Weather Conditions		Sample pH (Field)		Gage Heig	Gage Height-Ft.			
Preserved in: Field Lab		DO (mg/l)		Spec.Cond	Spec.Cond. (µS/CM)			
Date://		DO% Sat		Salinity (pp	om)			
Time:								
Chlorine Residual		Sample Depth Ft.		Tide Stage				
Comments/Field Checks		Barometric Pressure (mm		Turbidity (N	Turbidity (NTU)			
Motolo			REQUESTS		Organics (Drinking Water)			
Mg		Alkalinity Bromide by IC Chloride Chloride by IC Chloride by IC Chromium, Hexavalent Chromium, Hexavalent by Coolor Conductance Cyanide Dissolved Oxygen Fluoride	Fluoride by IC Hardness MBAS Odor pH y IC Phenols (PW) Sulfate by IC Sulfate Lachat Turbidity	□ EPA 504.1 - EDB, DBCP,123TCP □ EPA 505 - Chlordane □ EPA 505 - Toxaphene □ EPA 507 - N and P containing Pesticides □ EPA 515.3 - Chlorinated Acid Herbicides □ EPA 524.2 - Purgeables □ EPA 524.2 - Purgeables □ EPA 525.2 - Liquid-Solid Extractables □ EPA 531.1 - N-Methylcarbamoyloximes and N-Methylcarbamates Organics (Non-Potable Water)				
□ CuCopper □ U	Vanadium Zinc	Me ☐ Mercury by EPA 245.1	rcury	□ EPA □ EPA	624 – Purgeables 625 - Base/Neutral and Acid Extractables			
Preferred Methodology ☐ EPA 200.7 / 200.9 ☐ EPA 200		Low Level Mercury EPA Nut	rients		Demands			
Residues Total Suspended Solids (TSS)		☐ Nitrite ☐ Total Phosphorus	■ Nitrite + Nitrate □ Ortho Phosphorus		Organic Carbon (TOC) Olved Organic Carbon (DOC)			
☐ Total Solids (TS)		☐ Ammonia	Total Kjeldahl		nical Oxygen Demand (COD)			
☐ Total Dissolved Solids (TDS) ☐ Settleable Solids (SS) ☐ Total Volatile Solids (TVS)		☐ Nitrate (Calculated) ☐ Nitrogen, Total (Calculate	Nitrogen (TKN)	□ BOD	Suggested Dilutions 5 □ BOD20			
0		Other		СВО				
Relinquished By:	Affiliation:	Received By:		Affiliation:	Date/Time Reason for Custody Change			
Name (Print):		Name (Print):						
Signature:	NJDEP-BI	Signature,						
Name (Print):	_	Name (Print):						
Signature:		Signature:						