

**Appendix D**  
**Delaware Estuary Boat Run Program**  
**Site Information and Quality Assurance and Control**

**Table D1: Sampling Stations Parameter Categories for the Estuary Boat Run Program**

STATION	RIVER MILE	SAMPLING STATIONS FOR PARAMETER CATEGORIES			
		ROUTINE, BACTERIAL & RADIOACTIVITY	HEAVY METALS	ALGAL & ORGANIC CARBON	OXYGEN DEMAND
South Brown Shoal <sup>1</sup>	6.5				
South of Joe Flogger Shoal <sup>1</sup>	16.5				
Elbow of Crossledge Shoal <sup>1</sup>	22.75				
Mahon River	31.0				
Ship John Light	36.6				
Smyrna River	44.0				
Liston Point–Buoy 8L	48.2				
Reedy Island	54.9				
Pea Patch Island	60.6				
New Castle	66.0				
Cherry Island	71.0				
Oldmans Point	74.9				
Marcus Hook	78.1				
Eddystone, PA	84.0				
Paulsboro, NJ	87.9				
Navy Yard	93.2				
Benjamin Franklin Bridge	100.2				
Betsy Ross Bridge	104.75				
Torresdale	110.7				
Burlington Bristol Bridge	117.8				
Florence Bend					
Trenton Channel (Biles)					

**TABLE D2: METHODS OF ANALYSIS FOR PARAMETERS**

CATEGORY OF PARAMETERS	PARAMETER	METHOD REFERENCE	REPORTING LIMIT
ROUTINE	ACIDITY	EPA 305.1/STDMTD 18 <sup>TH</sup> ed. 2310B	1.0 mg/L
	ALKALINITY	EPA 310.1/STDMTD 18 <sup>TH</sup> ed. 2320B	1.0 mg/L
	CHLORIDE	EPA 325.2/STDMTD 18 <sup>TH</sup> ed. 4500-Cl	1.0 mg/L
	DISSOLVED OXYGEN	EPA 360.1/360.2/STDMTD 18 <sup>TH</sup> ed. 4500-O	0.1 mg/L
	PERCENT SATURATION	CALCULATED	1%
	HARDNESS	EPA 130.2	1.0 mg/L
	pH	EPA 150.1	0.1 unit
	DISSOLVED ORTHOPHOSPHATE	EPA 365.1/STDMTD 18 <sup>TH</sup> ed. 4500-P F	0.005 mg/L
	PHOSPHOROUS: TOTAL	EPA 365.1/STDMTD 18 <sup>TH</sup> ED. 4500-P F	0.005 mg/L
	SODIUM	EPA 200.7	5000 ug/L
	SPECIFIC CONDUCTANCE	EPA 120.1	1.0 uS/cm
	TEMPERATURE, AIR & WATER	EPA 170.1/STDMTD 18 <sup>TH</sup> ED. 2550B	N/A
	SUSPENDED SOLIDS, TOTAL & VOLATILE	EPA 160.2- .4/STDMTD 18 <sup>TH</sup> ed. 2540	1.0 mg/L
	TURBIDITY	EPA 180.1	1.0 FTU
	NH <sub>3</sub> -N	EPA 350.1/STDMTD 18 <sup>TH</sup> ed. 4500-N	0.005 mg/L
	NO <sub>2</sub> -N	EPA 354.1/ STDMTD 18 <sup>TH</sup> ed. 4500-N	0.005 mg/L
	NO <sub>3</sub> -N	EPA 353.2, 354.1/ STDMTD 18 <sup>TH</sup> ed. 4500-N	0.005 mg/L
TOTAL KJELDAHL-N	EPA 351.2	0.05 mg/L	
BACTERIAL	E. COLI	EPA 1103.1	N/A
	ENTEROCOCCUS	EPA 1106.1/STDMTD 18 <sup>TH</sup> ed. 9230C	N/A
	FECAL COLIFORM (MTEC)	EPA 825	N/A
ALGAL	CHLOROPHYLL A	(1) STDMTD 18 <sup>TH</sup> ed. 10200H	1.0 ug/L
	PHEOPHYTIN	STDMTD 18 <sup>TH</sup> ed. 10200H	1.0 ug/L
	SILICA	STDMTD 4500-Si E/D	1.0 mg/L
	PRODUCTIVITY, CARBON 14 METHOD	Procedure Developed by University of Delaware	uMC
	SECCHI DISK	N/A	N/A
	LIGHT TRANSMISSION	(2)	0.01 uM

**TABLE D2 continued**

CATEGORY OF PARAMETERS	PARAMETER	METHOD REFERENCE	REPORTING LIMIT
HEAVY METALS	COPPER, DISSOLVED	EPA 200.7	5 ug/L
	COPPER, TOTAL	EPA 200.7	5 ug/L
	CHROMIUM, HEXAVALENT	STDMTD 18 <sup>TH</sup> ed. 3500-CR	5 ug/L
	ZINC, DISSOLVED	EPA 200.7	10 ug/L
	ZINC, TOTAL	EPA 200.7	10 ug/L
RADIOACTIVITY	ALPHA EMITTERS	(3) EPA 900.0	5 pCi/L
	BETA EMITTERS	(3) EPA 900.0	5 pCi/L
	TRITIUM	(3) EPA 906.0	500 pCi/L
ORGANIC CARBON	DISSOLVED	EPA 415.1/STDMTD 18 <sup>TH</sup> ed. 5310-B	1 mg/L
	TOTAL	EPA 415.1/ STDMTD 18 <sup>TH</sup> ed. 5310-B	1 mg/L
OXYGEN DEMAND	ULTIMATE (60 DAY), DISSOLVED	EPA 405.1/STDMTD 5210-B	2.4 mg/L
	ULTIMATE (60 DAY), TOTAL	EPA 405.1/STDMTD 5210-B	2.4 mg/L

1.For Chlorophyll A, one split sample, for analysis at another laboratory selected by DNREC, was conducted.

2.Light transmission to be conducted as practical to obtain correlation with Secchi Disk readings.

3.Radioactivity analyses outsourced. All laboratory materials provided by the outsourced lab were provided to DRBC.

**Table D3: Frequency of Sampling by Parameter Category for the Estuary Boat Run Program**

CATEGORY OF PARAMETERS	PARAMETER	FREQUENCY
ROUTINE	ACIDITY	TWO TIMES MONTHLY <sup>(1)</sup> FOR APRIL, MAY, AUG., & SEPT. & ONCE MONTHLY FOR OCT., MAR., JUNE, JULY & OCT.
	ALKALINITY	
	CHLORIDE	
	DISSOLVED OXYGEN	
	HARDNESS	
	pH	
	PHOSPHOROUS: DISSOLVED ORTHOPHOSPHATE & TOTAL	
	SODIUM <sup>1</sup>	
	SPECIFIC CONDUCTANCE	
	TEMPERATURE, AIR & WATER	
	TOTAL SUSPENDED SOLIDS AND DISSOLVED SOLIDS	
	TURBIDITY	
	NH3-N, NO2-N, NO3-N & TOTAL KJELDAHL -N	
BACTERIAL	E. COLI	&
	ENTEROCOCCUS	ONCE MONTHLY FOR MAR, APRIL, MAY, JULY, AUG., SEPT. & OCT, FOR THE LOWER BAY STATIONS
	FECAL COLIFORM (MTEC)	
ALGAL	CHLOROPHYLL A	
	PHEOPHYTIN A	
	SILICA	
	PRODUCTIVITY, CARBON 14 METHOD	
	SECCHI DISK & LIGHT TRANSMISSION	
HEAVY METALS	COPPER, DISSOLVED & TOTAL	MONTHLY & 7 times per year for Lower Bay Stations
	CHROMIUM, HEXAVALENT	
	ZINC, DISSOLVED & TOTAL	
RADIOACTIVITY	ALPHA EMITTERS	ANNUALLY
	BETA EMITTERS	
	TRITIUM	
ORGANIC CARBON	DISSOLVED	QUARTERLY <sup>2</sup>
	TOTAL	
ULTIMATE OXYGEN DEMAND		

<sup>1</sup> Analyses of sodium are required only for stations above R. M. 78

<sup>2</sup> Not Required for Lower Bay Stations

## **Quality Assurance and Control**

### Special Training / Certification

Sample collection is performed by personnel who have experience in the collection of samples for chemical and physical analysis. All members of the sampling team must review and be familiar with the Sampling and Analysis Plan (SAP), the Quality Assurance Project Plan (QAPP), and the references to these documents.

Sample analysis must be performed by personnel who have experience in the analysis of environmental samples. All members of the analytical team must review and be familiar with the QAPP, the laboratory Standard Operating Procedures (SOPs) and the references to these documents.

### Quality Control

The minimum requirements consist of an initial demonstration of laboratory capability, analysis of samples spiked with labeled compounds or analysis of quality control samples to evaluate and document data quality, and analysis of standards and blanks as tests of continued performance. Laboratory performance is compared to established performance criteria to determine if the results of analyses meet the performance characteristics of the methods.

### Documents and Records

The Project Manager will be responsible for maintaining all documents and records associated with this project. Documents and records associated with this project will be kept and maintained in the project file at the Delaware River Basin Commission (DRBC) offices in West Trenton, New Jersey. Records will be maintained for a minimum of 5 years after completion of sampling and analysis.

### Standard Data Reporting Format

The Standard Data Reporting Format requires a signed paper copy of all data along with the supporting quality control information. An electronic data deliverable (EDD) is required of the laboratory.

Field data included in the EDD is taken from the field log books/sheets and submitted in a form specified by DRBC. Laboratory Reports are structured to clearly present all of the items required by the contract. The report shall be organized as follows:

Data is reported by sample or by test. Pertinent information includes, at a minimum, field sample identification, laboratory sample number, date the sample was collected, date the sample was received at the laboratory, date the sample was extracted / prepared, date the sample was analyzed, extraction / preparation / cleanup / analysis procedure(s) used, laboratory preparation batch number(s), dilution factors, all analytes tested for and their associated reporting limits, matrix, units, and sample description including preservation. Any other factors that could affect the sample results are also noted.

Any other information that is pertinent to the samples is also reported. This includes copies of original chain-of-custody forms, copies of any telephone conversation record sheets, and copies of any other forms. The Laboratory shall maintain on file all of the supporting data and documentation for these samples. The Laboratory shall provide, upon request, copies of raw data as the DRBC deems necessary for specific methods and samples.

Sample method and associated quality control information shall be reported in a standard format as a complete packet representing a batch of samples. The method quality control information should be presented as in a standard order following the sample data results. The laboratory should maintain the standard order of reporting to the maximum extent possible.