

Processing and Analysis Plan

For Fish Tissue

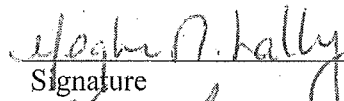
Connecticut River 2018-2019

CTDEEP

Bureau of Water Protection and Land Reuse

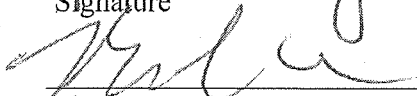
Work Approval/Plan Acceptance

CT DEEP WPLR Project Lead
Meghan Lally


Signature

9/25/19
Date

CT DEEP BNR Project Lead
Mike Beauchene


Signature


9/25/19
Date

CT DEEP Project QA Officer
Chris Bellucci


Signature

9/25/19
Date

UConn CESE Lead/QA Officer
Chris Perkins


Signature

9/25/19
Date

1.0 Project Objective

The Connecticut Department of Public Health (CT DPH) has requested the assistance of the Connecticut Department of Energy & Environmental Protection (CT DEEP) Water Planning & Land Reuse (WPLR) Bureau and the DEEP Bureau of Natural Resources (BNR) to collect fish tissue samples from the Connecticut River. CT DPH has a memorandum of understanding with the University of Connecticut Center for Environmental Science and Engineering (UConn CESE) Laboratory, 3107 Horsebarn Hill Road, Storrs, CT, to process and analyze the collected fish tissue for polychlorinated biphenyls (PCBs). The data collected will be used to inform fish consumption advisories for the Connecticut portion of the Connecticut River.

This sampling plan addresses the collection, handling, storage and transport of samples. All activities will be performed by CT DEEP staff. The preparation and analysis of samples is covered by relevant UConn CESE standard operating procedures, analysis methods and quality assurance plans.

1.1 Project Organization

Role	Name
CT DEEP WPLR Project Lead	Meghan Lally
DEEP BNR Project Lead	Mike Beauchene
Field Crew Supervisor	Brian Eltz
Field Crew Supervisor	Jacque Benway
Field Crew Supervisor	Tom Savoy
DEEP Project QA Officer	Chris Bellucci
Laboratory Lead/QA Officer	Christopher Perkins

1.2 Plan Distribution List

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<p>Sharee Rusnak Epidemiologist 2 CT DPH Environmental & Occupational Health Assessment Program 410 Capitol Avenue, Hartford, CT 06106 860-509-7583, sharee.rusnak@ct.gov</p>	<p>Brian Toal Program Supervisor CT DPH Environmental & Occupational Health Assessment Program 410 Capitol Avenue, Hartford, CT 06106 860-509-7741, brian.toal@ct.gov</p>

2.0 Special Training Requirements

DEEP staff performing the field sampling associated with this project is required to have the training and certification outlined in Table 1.

Table 1. Required Project Training

Project Function	Course or Description	Trained by	Training Frequency	Certifications/ Records
Safety	First Aid/CPR	CT Fire Academy	Every 2 years	DEEP personnel office
Safety	Electrofishing Safety	Field Crew Supervisor	Annual	DEEP Fisheries or WPLR
Data Quality and Comparability	Electrofishing (Fish Collection and Handling Methods)	Field Crew Supervisor	Annual	WPLR Records

3.0 Data Usage

Once approved for release by CESE, the data will be utilized by the CT DEEP and CT DPH to inform fish consumption advisories decisions.

4.0 Sampling Design

4.1 Sampling Locations

Sites listed in Table 2 will be sampled per standard operating procedure listed in the references. Sites are selected to represent locations either north or south of Middletown, CT. Sites north of Middletown are considered “River North” sites, and sites south of Middletown are considered “River South” sites. Samples are to be collected both below Middletown, CT (River South) and above Middletown, CT (River North) to allow for comparison of contaminant levels between these two areas.

Table 2. Sample Collection Locations.

Waterbody Name	Station ID	Location Description	Municipality	Latitude	Longitude	Sampling Zone
Connecticut River	19380	Bissell Bridge area	Windsor	41.80500	-72.64600	North
Connecticut River	15533	Near Park River confluence	Hartford	41.76000	-72.66430	North
Connecticut River	15960	at Glastonbury Ferry Dock	Glastonbury	41.66580	-72.62720	North
Connecticut River	19005	At Haddam Meadows State Park	Haddam	41.48485	-72.50888	South
Connecticut River	20120	Approximately 1 mile north of I-95	Old Saybrook	41.33300	-72.35561	South
Connecticut River	20145	Middle Cove	Essex	41.34917	-72.38666	South

4.2 Target Species

At the request of CT DPH, target species will include common carp (*Cyprinus carpio*) and channel catfish (*Ictalurus punctatus*). Field crews will be instructed to obtain 15-20 fish of each species, from both the north and south sections of the river, for a total of 60-80 fish.

Fish should represent specimens that satisfy legal requirements of harvestable size. Fish with obvious deformities, lesions, or other signs of compromised health should not be included in the study. For each species, fish of legal harvest length and of similar weight and length should be targeted. Crews will therefore be instructed to target carp of 700-900 mm total length and channel catfish of 450-750 mm total length, however field conditions may necessitate retaining fish outside of these ranges.

4.3 Sampling Methods

Fish will be collected by State of Connecticut DEEP personnel following standard Agency methods and recommendations in Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 1: Fish Sampling and Analysis, Second Edition (EPA 1995).

Several collection methods will be utilized including boat electrofishing, trawl surveys, seining, and angling.

Recreational tournaments are held throughout the year on the Connecticut River. If necessary, staff will reach out to tournament organizers to discuss the possibility of retaining fish collected during competition for inclusion in this study. Fisheries staff may also be employed to retain any fish collected during recreational angling efforts during the season.

DEEP BNR Fisheries Division staff also routinely conduct trawl surveys along the southern reaches of the Connecticut River as well as seine surveys in the northern section of the CT portion of the River. Staff involved in these sampling efforts will be requested to label and preserve any carp collected during these efforts as outlined in this plan. These fish will be transported on wet ice, and temporarily stored in the sample freezer at DEEP Marine Fisheries Headquarters in Old Lyme, CT and then transported by Water Monitoring staff to the DEEP Windsor Lab in Windsor, CT as soon as practical.

If a sufficient number of fish are not collected via tournaments and routine BNR Fisheries Division surveys, targeted boat electrofishing methods will be employed. Collection will occur using standard DEEP BNR Fisheries Division protocols. If the project lead is not present during electrofishing, arrangements will be made for a DEEP Water Monitoring Group staff to meet the field crew in the field to transfer possession of the samples and deliver to the DEEP Windsor Lab.

4.4 Field Identification and Documentation

Prior to each sampling event, the senior fisheries biologist is provided a copy of the Field Data Sheet/Chain of Custody complete with appropriate species list/quantities (Appendix A). The collected fish should be handled minimally. As the fish are collected they should be placed into a clean live well with ambient river water.

At the conclusion of the sampling run, the fish most suitable for analysis will be selected for preservation. Selected fish will be identified to species and measured for total length in mm. Fish identifications are supervised and confirmed by the senior fisheries biologist on site.

Individual fish are placed into a plastic bag with a label documenting the fish species, total length, collection date, and collection location. The sealed bag is then placed into a cooler with wet ice for transport.

5.0 Interferences and Potential Problems

All equipment is rinsed with stream water following sampling. Additional cleaning occurs with a scrub brush and hose at the field headquarters prior to storing the gear. Electroshocking probes are sanded to remove corrosion.

Fish are placed in a sample storage bag at the collection site. The sample bag is taped closed and is not opened prior to sample processing at CESE.

6.0 Sample Handling and Preservation

6.1 Sample Storage and Transport

Samples are transported to the DEEP Windsor Lab (9 Windsor Ave, Windsor, CT) as soon as possible after collection. If transport is not possible the same day as the sample, the fish will be held overnight in the freezer of the nearest DEEP BNR Fisheries Division field office. The field datasheet/COC is to remain with the fish at all times.

Upon delivery to the DEEP water laboratory, WPLR staff will remove each fish from the cooler and verify that the field data sheet/COC and sample labels are complete and in agreement. Each sample will be logged into the bound Fish Tissue Laboratory Logbook for the current sampling year. The fish details (species, total length) as well as collection information (collector, date, and location) are recorded in the log book and a lab accession number, if not assigned in the field, is assigned. Fish are frozen whole in a temperature controlled freezer at < -20 C (EPA 2000). Frozen whole fish will be delivered as soon as practical by CT DEEP WPLR staff to UConn CESE. Care should be taken to adhere to hold times for target analytes; the U.S. EPA recommends fish tissue collected for analysis of organics be hold for no more than 1 year (EPA 2000).

Upon delivery to CESE, The field datasheet/COC which documents site, sample date, species, total length, analysis requested, and date of receipt will be signed by both DEEP and CESE and used as a record of sample transfer. DEEP staff will obtain photocopies of the completed Chain of Custody forms when delivery of samples to CESE is completed. The original signed chain of custody will remain with the delivered samples at CESE and filed according to laboratory protocols.

6.2 Sample Processing

All sample processing will be completed and documented by trained CESE staff according to standard laboratory operating procedures and quality assurance plans. No sample processing will occur at the Windsor Lab in association with this study.

Upon receipt of the samples, CESE will store the samples in a monitored freezer until they can be processed. Fish will be scaled, with the skin left on and filleted. A fillet will be taken from the left side of the fish and homogenized for analysis. The remaining fish (or right side fillet) will be re-wrapped in foil, labelled and archived in the lockable freezer for future QAQC use if needed. Fillets will be analyzed individually, not as composites.

7.0 Sample Analysis

The prepared fish tissue samples will be analyzed for the PCB congeners and aroclors listed in Tables 3 and 4, using the analytic methods and detection limits noted.

Table 3: PCB Congener List

Analyte	Analytical Method	Detection Limits	Reported as
biphenyl	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2 CB (1)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,3 diCB (5)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
3,4 diCB (12)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',5 triCB (18)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,4,4' triCB (28)+2,4',5 triCB (31)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',3,5' tetraCB (44)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',5,5' tetraCB (52)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,3',4,4' tetraCB (66)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',4,5,5' pentaCB (101)+2,2',3,4',5 pentaCB (90)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,3,3',4,4' pentaCB (105)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,3,3',4',6 pentaCB (110)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,3',4,4',5 pentaCB (118)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',3,3',4,4' hexaCB (128)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',3,4,4',5' hexaCB (138)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',3,4',5,6 hexaCB (149)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',4,4',5,5' hexaCB (153)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',3,3',4,4',5 heptaCB (170)+2,3,3',4,4',5,6 heptaCB (190)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',3,4,4',5,5' heptaCB (180)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',3,4',5,5',6 heptaCB (187)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',3,3',4,4',5,6 octaCB (195)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',3,3',4,4',5,5',6 nonaCB (206)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
2,2',3,3',4,4',5,5',6'6' decaCB (209)	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight

Table 4: PCB Aroclor List

Analyte	Analytical Method	Detection Limits	Reported as
aroclor 1016	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
aroclor 1221	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
aroclor 1232	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
aroclor 1242	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
aroclor 1248	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
aroclor 1254	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight
aroclor 1260	CESE PCB-010-01	0.39-2.18 ug/kg	Wet Weight

For each sample, 30 grams (dry weight) of tissue is required. For analysis quality control purposes another 30 grams each are needed for matrix spike (MS) and matrix spike dup (MSD), so care will be taken by DEEP to fish are selected to ensure sufficient tissue are available for sample and QC requirements.

8.0 Schedule of Tasks and Products

Task	Responsible Party
Sample Collection	DEEP WPLR & BNR
Sample Storage and Delivery	DEEP WPLR
Sample Processing	UCONN CESE
Sample Analysis	UCONN CESE
Reporting Results	UCONN CESE
Results Distribution	DEEP WPLR

9.0 Field Safety

DEEP field safety protocols for fish community sampling will be followed by all sampling staff (CT DEEP 2013).

Field teams will include at least five people, at least two of whom are experienced in fish sampling and tissue collection. A first aid kit and AED will be included in the utilized DEEP vehicle.

10.0 Data Quality Requirements and Assessments

The quality of the data is to be within the ranges associated with the specific approved protocols as noted in Table 4.

10.1 Data Representativeness

Samples are expected to represent tissue PCB levels of the particular species of fish in the water bodies where they were collected at the time of collection. Field and laboratory conditions that may affect sample integrity are to be documented on the chain of custody

forms, CESE sample receipt form, laboratory and field logs, and/or final report, as applicable.

10.2 Data Comparability and Completeness

Data will be reported as concentration of PCB congeners and arochlors in wet weight.

In the analytical report the laboratory will also provide the following information for data management purposes:

- Method number and name
- Reporting limits
- Resultant value
- Percent solid
- DEEP Field sample number
- CESE Lab sample number

Subsequent to CESE review and report release protocols a report and results will be sent to the DEEP Project Lead who will forward the results to the distribution list noted at the beginning of this plan. The report of results will be sent by CESE to CTDEEP as an Excel spreadsheet.

10.3 Corrective Action

When it is found that data are incomplete or that results are unacceptable, CESE, DEEP and/or DPH Project Leads may determine that one or more of the following procedures for corrective action shall be undertaken:

1. When the test does not meet prescribed analytical QC goals, the available data will be reviewed by the project officers and the Chemistry Team Lead. The possibility of retesting will be considered as necessary by DEEP, DPH and CESE.
2. Reconsideration of acceptable limits with a statement explaining the results of the action/rationale may be taken.
3. Rejection of data and exclusion from the report may occur provided a written explanation from CESE is provided to DEEP and DPH.
4. Rejection of the entire sample/station location with explanation for rejection and recommendation of correction including reconsideration of results may be recommended by project staff from CESE or DEEP.

11.0 Data Usability

The CESE and DEEP project officers will determine the usability of the data.

12.0 Documentation, Records, and Data Management

A hard copy of any project field notes, chain of custody forms, and data reports will be kept on file in the fish tissue file section of the Windsor Lab.

All CESE laboratory documentation including laboratory sample receipt, storage, sample

processing and analysis will be maintained according to accepted industry protocols.

Electronic data and any electronic files from this project (e.g. scanned COCs, reports, and field datasheets) will be maintained by DEEP staff. The files will reside on the DEEP Computer Network maintained by the DEEP Information and Technology Department. The network is backed up regularly any electronic project files can be restored following catastrophic loss or corruption.

13.0 Final Report

Following CESE review and approval, a final report and the results of this laboratory analysis containing the information described in Section 10.2 above will be released to Meghan Lally, the CTDEEP Project Lead. Upon release the data and report will be reviewed by the Project QA Officers and then shared with the full distribution list for the project.

14.0 References Cited

Connecticut Department of Energy and Environmental Protection (CT DEEP) 2013. Standard Operating Procedures for the Collection of Fish Community Data from Wadeable Streams for Aquatic Life Assessment. Bureau of Water Protection and Land Reuse, Planning and Standards Division, Hartford, CT.

https://www.ct.gov/deep/lib/deep/water/water_quality_management/monitoringpubs/fish_communitysop.pdf

United States Environmental Protection Association (U.S. EPA) 2000. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories: Vol 1, Fish Sampling and Analysis: 3rd edition. EPA 823-B-00-007. Office of Water, Washington D.C.

<https://www.epa.gov/sites/production/files/2018-11/documents/guidance-assess-chemical-contaminant-vol1-third-edition.pdf>