STANDARD OPERATING PROCEDURE FOR COLLECTION AND PREPARATION OF FISH TISSUE FOR ANALYSIS

WATER QUALITY

State of Utah
Department of Environmental Quality
Division of Water Quality

Revision 3.1
Updated March 2020

Foreword

Utah Division of Water Quality (DWQ) Standard Operating Procedures (SOPs) are adapted from published methods or developed by in-house technical experts. This document is intended primarily for internal DWQ use. This SOP should not replace any official published methods.

Any reference within this document to specific equipment, manufacturers, or supplies is only for descriptive purposes and does not constitute an endorsement of a particular product or service by DWQ. Additionally, any distribution of this SOP does not constitute an endorsement of a procedure or method.

Although DWQ will follow this SOP in most instances, there may be instances in which DWQ will use an alternative methodology, procedure, or process.

The methodology detailed below is the protocol followed by DWQ's monitoring staff and verified by DWQ's Quality Assurance officer.

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Revision page

Date	Revision	Summary of Changes	Sections	Other Comments
6/1/12	1	N/A	N/A	Previous version was put into a new standardized format, QC section was revised, equipment checklists updated, and began document control/revision tracking.
6/11/12	2	Removed the entire homogenization step and associated equipment decontamination steps. Removed following QC samples: acid blanks, sample blanks.	9 & 11	As per conversations with Jack Sheets, EPA Region 8 Laboratory. EPA has found no difference in duplicate performance among homogenized versus non-homogenized fish muscle tissue over multiple years. Also cited internal studies performed by Region 9. Jack informed DWQ that tissue homogenization was no longer necessary.
5/23/13	2.1	Added more tissue analysis. Changed glove usage.	4 & 9	Re-worded verbiage to indicate fish tissue contamination and not just Hg contamination in order for other analytes to be included with these methods (i.e. Se and PCBs). Changed some procedures regarding use of gloves.
5/1/14	2.2	Added acid blanks. Updated collected fish size.	11	Added acid blanks. Changed fish size collected to be based on consumed size rather than strict lengths. Minor editorial changes.
1/29/20	3.0	Update language, grammar and SOP structure.	All	Major update to reflect 2020 sampling procedures and to improve overall clarity. Removed acid blanks.
4/1/20	3.1	Update Title	All	Updated the title page from “Mercury analysis” to reflect additional fish tissue analyses (i.e., Selenium, PCBs).

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1.0 SCOPE AND APPLICABILITY

The following document presents the Utah Division of Water Quality's (DWQ) Standard Operating Procedure (SOP) for the collection and preparation of fish tissue samples. These methods are primarily used for mercury and selenium analysis but can also be used for parameters like Polychlorinated Biphenyls (PCBs) and other heavy metals.

Mercury

The presence of mercury in Utah's waterbodies is a significant human health concern. People in the U.S. are exposed to mercury primarily through consumption of fish and shellfish contaminated with mercury, an organic mercury compound (EPA, 2010). Mercury exposure can cause impaired neurological development in fetuses, infants, and children. As a result, DWQ has initiated statewide sampling to provide critical information to the public concerning human health threats. Mercury information and fish advisories for the State of Utah can be found online at: **mercury.utah.gov/**.

Mercury is known to be bioaccumulative, persistent, and toxic, particularly in the aquatic food chain. Mercury concentrations in the water column and sediment are often below analytical detection limits; but it is detectable in fish tissue because of bioaccumulation. For this reason, fish serve as key indicators of waterbodies contaminated by mercury as well as an indicator for human exposure via ingestion.

Selenium

While selenium is an essential nutrient for fish at low levels, it can also be harmful with high exposure rates. At higher levels, selenium can cause reproductive damage and mortality in fish. In humans, the seriousness of the harmful effects of excess selenium is dependent on the amount and frequency of selenium consumed. Excessive selenium consumption can be life-threatening without immediate medical treatment. In extreme cases, high exposure to selenium can lead to selenosis. Certain forms of selenium (selenium sulfide) are probable human carcinogens.

1.1 Background

In 2000, Utah DWQ began collecting fish tissue samples for mercury analysis as part of the Utah Comprehensive Assessment of Stream Ecosystems Program (UCASE) and has sampled to some extent each year thereafter. DWQ partners with the Utah Division of Wildlife Resources (DWR) for fish collection and with the Utah Department of Health to designate health advisories. DWQ will often consult with its contracted lab for things related to lab processing (methods; QA/QC considerations; data reporting; etc.) Currently, most tissue samples are collected by DWR during their annual gill netting surveys and then processed by DWQ. Sampling efforts have been primarily focused on lakes/reservoirs over the last several years. This SOP outlines the methods used by the DWQ and DWR for the collection and preparation of fish tissue samples prior to analysis in the laboratory.

2.0 SUMMARY OF METHOD

Depending on the waterbody, fish samples can be collected by electro-fishing, gill netting, fyke netting, or using hook-and-line. In order to obtain a statistically valid sample size for human advisory criteria, 5-10 individual samples of the same species per waterbody is desired. After collection, the length, weight, and species of fish are recorded. When labeling each specimen, a unique code is created using DWQ's waterbody site code in conjunction with the fish species ID code; and the fish sequence number (e.g. 4956600CTT01). If DWQ's site code is unknown, label it with the fish species ID and fish sequence number. The whole fish or fillet is wrapped in aluminum foil, labeled, and stored with the other samples on dry ice or a freezer. The sample is frozen until a tissue sample can be prepared by DWQ personnel in a laboratory space. Samples are analyzed by the USEPA Region 8 Laboratory, but a variety of labs have been used in the past based on availability. Determination of the analyzing laboratory depends on available resources and funding. However, any laboratory utilized must use approved EPA analytical methods and must have documented quality assurance and quality control procedures.

The field metadata (fish length and weight, collection site, date and time, sample type, etc.) are entered into the DWQ database. During processing, a subsample of tissue is removed from each fish, placed in a sterile tube and stored in the freezer until it is shipped on ice for analysis. Once the laboratory results are received and validated by DWQ, they are combined with the field metadata set in the DWQ database.

3.0 DEFINITIONS

DI:	deionized water
in:	inches
mL:	milliliters
mm:	millimeters
PCBs:	Polychlorinated Biphenyls
PET:	polyethylene terephthalate
site ID:	DWQ's internal labeling code associated with waterbodies and sites
TB:	tube blank
UCASE:	Utah Comprehensive Assessment of Stream Ecosystems Program
µl:	microliters
QA/QC:	quality assurance and quality control

4.0 HEALTH AND SAFETY WARNINGS

Hazardous conditions potentially exist at every waterbody. If unfavorable conditions are present at the time of sampling, it is recommended that the sampling be rescheduled. If hazardous conditions arise during sampling, such as lightning, high winds, rising water, or flash flood warning, personnel should cease sampling and move to a safe location.

When working in Utah and other warm climates, precautionary steps should be taken to avoid heat induced illnesses such as heat stroke or heat exhaustion.

Use caution when working in waders as drowning hazards exist.

Take appropriate precautions when operating equipment and working on, in, or around water, as well as possibly steep and unconsolidated banks, bridges, or edges of ponds/lagoons. All field crews should follow DWQ health and safety procedures and be equipped with safety equipment such as proper wading gear, personal flotation devices (PFDs), gloves, first aid kits, cellular phone, etc.

Use caution when electrofishing as electrical shocks could be harmful to recreators, wildlife, and/or crew members.

Use caution when handling fish as the fins, gills, and/or teeth of some species may be sharp.

Use caution when using scalpels and nitric acid. Sample processors must wear safety glasses/goggles, gloves, and lab coats.

5.0 CAUTIONS

Working with electrofishing equipment is dangerous, and adverse conditions could damage equipment. Ensure equipment is functioning properly prior to sampling.

6.0 INTERFERENCES

Analyses of mercury, selenium, heavy metals, and PCBs in fish tissue are highly sensitive, and interference may result from using contaminated equipment or sampling containers. Follow all decontamination procedures described throughout this SOP and prepare and analyze the quality control samples listed in **Section 11.0** of this SOP.

Maintain sample integrity by keeping samples on ice or in a freezer. Contamination due to inappropriate handling or improper storage and preservation techniques could lead to erroneous data and potentially inappropriate health advisories.

7.0 PERSONNEL QUALIFICATIONS/RESPONSIBILITIES

DWQ personnel processing fish tissue sampling must be familiar with sampling techniques, safety procedures, proper handling, and record keeping. Samplers are responsible for attending refresher meetings held each spring/summer to review procedures and techniques. New staff will be trained in the field and lab by DWQ personnel.

It is unnecessary for cooperators to sign the DOC form when exclusively collecting fish samples for DWQ. However, it is highly recommended they understand collecting methods outlined in this SOP. New laboratory sample processors (if unaccompanied by a previously trained processor) must also complete an initial Demonstration of Capability (DOC) for this method (see **Appendix 2**) and demonstrate on a yearly basis or as needed (to be overseen by designated Field Coordinator).

8.0 EQUIPMENT AND SUPPLIES

FIELD (for sample collection):

- Copy of this SOP
- GPS Unit
- Fish weigh scale
- Fish collection gear (nets, electrofisher, etc.)
- Plastic bags/trash bags
- Coolers with dry/wet ice
- DWQ fish field sheet (**Figure 1**)
- DWQ fish sample labels (**Figure 2**)
- Nitrile gloves
- Heavy duty aluminum foil
- Clear tape
- Fish measuring board
- Waterproof pen

LABORATORY (for sample processing):

- Copy of this SOP
- Freezer
- Nitrile gloves
- Sodium bicarbonate (baking soda)
- Safety glasses/goggles
- Scalpel handle and stainless steel blades (size 21)
- Metal laboratory scoop or spatula (“scoopula”)
- Heavy duty aluminum foil
- Laboratory-grade DI water
- 500 mL Teflon wash bottles (fill with the 10% nitric acid rinse solution before beginning procedure)

- 10 % nitric acid rinse:
    - ultra-pure certified trace-metal grade concentrated nitric acid and DI water
- Micropipetter and 100 µl disposable pipette tips
- Sterile 15 ml PET centrifuge tubes (Fisher cat# 05-539-1) and tube racks
- Lab Request forms or Chain of Custody forms (**Figure 6**) and seals (**Figure 7**)
- Tube labels (**Figure 5**)
- Excel file to enter metadata (**Figure 4**)

9.0 PROCEDURES

9.1 Field Collection Methods

9.1.1 Stream Collection

Five individuals from each consumable fish species is the minimum requirement (maximum of 10) for comparison to human health criteria (EPA, 2000). Fish can be collected using electrofishing methods (Peck et al., 2006). When electrofishing, the crew works upward through the stream to catch, identify, and measure all collected fish while transporting a small live well for storing fish samples for further tissue analysis. Once the dominant consumable species are determined, five to ten individuals of each species, representing the size class that is most likely to be kept and consumed by anglers from that stream, will be collected. In cases where streams have low densities of larger fish, fish in a smaller length category are utilized to obtain the five-fish minimum. In reaches with low fish populations, the reach is extended until at least five fish in the desirable size-range are collected. For more information on electro-fishing methods and procedures, see the UCASE Field Manual.

The data sheet to be filled out by fish collectors in the field is included in **Figure 1** (front and back). The collected fish are then processed as described in **Section 9.2**.

9.1.2 Open Water Collection (lakes, reservoirs, ponds, wetlands)

Fish in open water are collected using gill nets, fyke nets, electrofishing, and/or hook-and-line. The preferred sample set is ten individual fish of the same species and of the size people are most likely to consume from that waterbody (see **Section 9.1.1** above for general size categories). Lakes with multiple dominant species should include fish from the pelagic zone and bottom feeding fish. Lakes may have multiple pelagic species; therefore, ten (any amount over 5 is acceptable) individuals from at least two (more if feasible) pelagic species should be collected. Multiple sampling sites for large water bodies should be determined on the basis of habitat variability or locations where fish are most accessible to anglers. Sampling sites are determined by DWR/DWQ staff based on water resource management goals.

Gill nets are generally set on lakes and reservoirs in cooperation with DWR. The net is deployed overnight and pulled the next day. At each waterbody, DWR will complete a field collection form (**Figure 1**) with pertinent information as it relates to the sampling location (e.g. site name,

county, date, coordinates, etc.) It is unnecessary to record site location information for each net when multiple nets are deployed. The exception to this is Lake Powell and Flaming Gorge Reservoir. In these cases, site coordinates are needed for each net location and shall be recorded on the field collection form and the sample itself. As the net is pulled, the crew removes the fish from the net as it emerges from the water and determines which fish are to be kept for processing (five to ten) individuals for each species netted that are most representative of what people would eat). The retained fish are processed in the field as described in **Section 9.2**.

9.2 Field Sample Preparation

Whole fish samples are preferred and should be collected whenever possible, but individual fillets can be prepared as described in **Section 9.2.2**. Collecting whole fish reduces the possibility of contamination that might occur while processing fillets in the field. Fillets can be taken when large fish are collected and/or the volume of cold storage space is limited. The following sections describe the procedures for preparing whole fish field samples and filleted field samples.

9.2.1 Whole Fish Field Sample Preparation

Processing begins immediately following collection of the required number of fish.

1. Euthanize the fish, if necessary.
2. Start with a clean measuring board and scales for each waterbody.
3. Record the species, length, and weight on the field data sheet (**Figure 1**).
4. Prepare the label (**Figure 2**) with the required identification and field information. Make sure entries on the sample label are completed for each individual fish and are consistent with the field data sheet.
5. Place the entire fish on a clean sheet of aluminum foil, dull side toward the sample.
6. Make sure the piece of foil is wide enough to fold up over the ends of the fish. Also, fold down the edges of the foil so that no sharp edges of foil remain exposed. Do not use tape to wrap the sample; use foil only.
7. Attach the label to the foil-covered sample and cover the label with a strip of clear tape so that it does not get wet. Place the sample in a plastic bag (multiple samples can be placed in the same bag if they are from the same waterbody).
8. Immediately place the sample on dry ice. If dry ice is not available, place the sample on wet ice and transfer to a freezer or dry ice as soon as possible.

9.2.2 Fillet Field Sample Preparation

Fillets *are not* the preferred field processing method for tissue analysis because of the possibility of contaminating samples in the field. However, if large fish sizes or cooler capacity are limiting, fillets can be prepared. In this situation a clean working area is needed. This procedure requires a stainless steel fillet knife, a clean durable surface such as a non-metal table or plastic

cutting board, and rinse water (site water, tap water, DI water). Preparation and planning are necessary to assure that all equipment and decontamination supplies are available.

Note: This method is a summary of a fillet sample preparation. If the sampler is unfamiliar with this procedure, it is suggested that they find a training procedure elsewhere.

1. Complete steps 1 through 4 described in **Section 9.2.1**.
2. Remove the scales, if necessary.
3. Lay the fish on its side on a flat surface (non-metal).
4. Make a cut along the entire length of the gill (behind the gill and pectoral fin) through the skin and tissue until the bone.
5. Make a cut with your blade parallel to the backbone from the gill to the tail.

Note: A single cut is made from behind the gill cover to the anus cavity. Cut around the anal fin. If the gut cavity is punctured, the fillet sample may be contaminated.

6. Remove the fillet. The skin can remain on the other side of the fillet.

Note: See **Figure 3** *for more information.*

7. Complete steps 5, 6, and 7 described in **Section 9.2.1**.

9.3 Preparation of Fish Tissue for Chemical Analysis

The processing space must have clean counters, a sink, and the other items listed in Section 8.0. Fish samples should be processed as soon as possible, based on resources available for analysis and fish advisory reporting time frames. However, samples may remain stable in the freezer for up to five years (Peck, 2007). Fillet sample preparation follows the same guidelines as whole fish sample preparation with one exception. Instead of removing the required sample from the whole fish as described in Step 10 below, the sample is extracted from the fillet.

Note: prior to starting processing efforts, site IDs for each waterbody should already be designated. A general sample inventory for all samples should be completed before processing as well.

1. Open the appropriate files associated with this project. These files can be found on the DWQ network by following this folder pathway listed below. The following files will be needed:
    a. Sample inventory for the year (completion status)
    b. Metadata file (lengths, weights, location, date, sample type, etc.)
    c. Bottle label template

Folder pathway: U:\PERMITS\MONITORS\Fish Tissue Contamination Program (UTFTIS)

2. Remove the frozen samples from the freezer and allow to defrost until a scalpel can be inserted into the muscle of the fish.
3. While samples are defrosting, enter the lengths and weights from the field data sheets into the Excel file.
4. Fill out the labels for sterile 15 ml PET tubes such that the following info is included: site code; site description; date collected; unique fish ID (see Figure 5 for tube labels).
5. All individuals handling fish must wear clean nitrile examination gloves and safety glasses/goggles (lab coats are optional). Replace gloves between each processed fish.
6. Pour sodium bicarbonate (baking soda) into the lab sink to the side of the drain for neutralization of the acid that will be used during the procedure.
7. Prepare a scalpel/blade and scoopula by rinsing them with DI water or tap water followed by a 10% nitric acid solution rinse followed by a DI water rinse. Throughout the procedure, perform acid rinsing in the sink, allowing the rinsate to contact the sodium bicarbonate to neutralize the acid before it runs into the sink drain.

Note: All DI water used in this procedure should be laboratory grade.

8. Place a clean sheet of aluminum foil on the work surface, dull side up.
9. Unwrap the fish sample and place on the foil-covered work surface. Save the foil wrapper.
10. Make an incision with the stainless-steel scalpel between the head and the dorsal fin; slightly to one side of the backbone. Cut to the rib cage but not into the body cavity. Cut out a rectangular chunk of muscle that will allow for at least 3 grams of tissue once it is processed. Belly tissues should not be included in the sample. Cut (or peel) the skin, fat, and blood spots off the chunk of muscle tissue.
11. Place the tissue into the labeled 15 mL tube, using a scoopula if needed to help dig the sample out of the fish or to put the sample in the vial. Replace cap on tube.
12. Place the labeled 15 ml tube in a tube rack with the other samples you are working on. Place the rack of tubes into a freezer as soon as possible.
13. Rewrap the remaining fish in the original foil and return the specimen to the freezer. If the original foil is torn and unable to recover the entire fish, it is acceptable to cover the sample with new foil (dull side "in"). Maintain all labeling.
14. Decontaminate equipment between samples. Rinse the scalpel/blade and scoopula with DI or tap water, then acid from the wash bottle acid, and then rinse with DI water. Change the scalpel blade only if it gets dull, breaks, or when starting a new day of processing.
15. Remove, discard, and replace the foil from the work surface between fish of different species, and fish from different sampling locations.
16. Discard the nitrile gloves after processing each individual fish.
17. Repeat steps above for the remaining fish.

18. If samples are not immediately shipped, place the tube rack with all samples positioned upright in a freezer until they are ready to be shipped to the lab.
19. When samples are ready to be shipped, prepare a Chain of Custody form (**Figure 6**), package the frozen tubes on ice packs along with a return address label, tape the cooler, and attach a Chain of Custody seal (**Figure 7**). Ship the cooler to the contracted lab.

9.4 Laboratory Analytical Methods

EPA method 7473 (thermal decomposition) requires less than 1 gram of fish tissue to produce analyses with reporting limits as low as 0.005 µg/kg total mercury (EPA, 1998). Selenium method 200.8/6020 requires the same amount of tissue. However, to assure the lab has adequate tissue mass, it is best to provide at least 3 grams so that there's enough sample to run both tests, and to allow for duplicates or retesting. The methodology and QA/QC procedures for this analysis and analyzing laboratories can be obtained from the contracted lab.

10.0 DATA AND RECORDS MANAGEMENT

Requirements for recording field data are described throughout Section 9.0. Hard copies of field forms are stored at DWQ.

Note: **Figure 4** *is only an Excel file template and can be reformatted by the DWQ staff member responsible for entering the field data for tissue analyses. The purpose of this sheet is to transfer key data from field sheets/labels to one location so it can be uploaded into the water quality database. Key headers include: site name, site ID, gear, sample count, unique fish ID, length, weight, and sampler(s).*

Laboratory results for blanks (**Section 11.0**) should be reviewed by the DWQ laboratory liaison/database manager. If results are above the detection limit, the data should be flagged in the database, the DWQ Monitoring Section Manager notified, and attempts should be made to determine the source of contamination.

Files relating to field collection and lab processing will be stored here:
U:\PERMITS\MONITORS\Fish Tissue Contamination Program (UTFTIS)

For management of analysis results received from the laboratory, refer to the DWQ's Quality Assurance Program Plan.

11.0 QUALITY CONTROL SAMPLES

11.1 Tube Blanks

When a package containing a new lot of sterile 15 ml PET centrifuge tubes is opened, a tube blank is prepared. The purpose of this tube blank is to ensure that tubes used for sample transport to the analyzing laboratory are not introducing metals and other contaminants to fish tissue samples. This blank also tests the processing lab's DI water for contamination.

1. Put on a clean pair of nitrile gloves.
2. Using the graduated marks on an unused sterile 15 ml tube, fill the tube with 10 mL of DI water directly from the dispenser and label the tube with the lot number and date. Labeling example: 03032020TBLot3452 (Tube blank performed on March 3, 2020 for a new package of tubes, it is a tube blank (TB), and the lot number is 3452).
3. Using the micropipetter and tips, preserve the sample by adding 100 µl of 10% nitric acid to the sample tube. Replace the lid and mix.
4. Place the sample in the tube rack inside the cooler with the other fish tissue samples.
5. Fill out a lab sheet for each blank. The lab sheet should indicate the sample ID from the 15 ml tube.
6. Discard used nitrile gloves and pipette tip.

11.2 Replicates

A replicate sample should be collected every 10 samples (10% of samples should be a replicate). The purpose of a replicate is to determine if the fish tissue targeted for sampling is homogeneous and to test the sample handling and precision of the analyzing laboratory.

1. After collecting the tissue sample, collect another sample from the same fish, targeting a location immediately adjacent to the original sample, following the steps in Section 9.3.
2. Label the sample tube the same way as the parent sample and add "(Replicate)" to the end of the sample ID.

Example:
DWQ Site ID: 5954860
Site Description: Blind Lake
Date: 08/25/2020
Fish ID: 5954860CTT10 (Replicate)

12.0 REFERENCES

EPA. 1991. Environmental Monitoring and Assessment Program (EMAP) Near Coastal Program laboratory methods for filleting and compositing fish for organic and inorganic contaminant analyses (Draft). Office of Research and Development, Environmental Research Laboratory, Narragansett, RI.

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EPA. 2000. Quality assurance project plan for sample collection activities for a national study of chemical residues in lake fish tissue. U.S. Environmental Protection Agency. Washington, DC.

EPA. 2010 (Last updated). U.S. EPA Mercury Web Site. U.S. Environmental Protection Agency. Washington, DC. Available online at http://www.epa.gov/mercury/effects.htm.

Peck, D.V., Herlihy, A.T., Hill, B.H., Hughes, R.M., Kaufmann, P.R. Klemm, D.J., Lazorchak, J.M., McCormick, F.H., Peterson, S.A., Ringold, P.L., Magee, T., and M. Cappaert. 2006. Environmental Monitoring and Assessment Program – Surface Waters Western Pilot Study: Field Operations Manual for Wadeable Streams. EPA/620/6-06/003. U.S. Environmental Protection Agency, Office of Research and Development, Washington, D.C.

Peterson, S.A., Peck, D.V., Sickle, J.V., and R.M. Hughes. 2007. Mercury concentration in frozen whole-fish homogenates is insensitive to holding time. Archives of Environmental Contamination and Toxicology 53(3): 411-417.

Related DWQ Documents:

Utah Comprehensive Assessment of Stream Ecosystems (UCASE) Field Operations Manual

13.0 FIGURES

Figure 1a. DWQ Fish Field Sheet (front). (U:\PERMITS\MONITORS\UCASE\Official Packet\Complete Packet\ DWQ Fish Field Sheet.doc)

Reviewed by (initial): ________
Updated: 03/2020

DWQ Electro-shocking/Fish Tissue Collection Field Sheet

Please use a new sheet for each site (do not combine multiple sites on one sheet)

Site Name:		
Site ID:		
County:		
Date:		
Site Coordinates		
Latitude (N)	Longitude (W)	Other (UTM/Degree Minutes Seconds):
Electro-shocking Reach Length (m):		
Shocker Settings		
Shocking Time (s):		
Volts:		
Pulse Rate (Hz):		
Pulse Width (ms):		

ELECTRO-SHOCKING DATA

- Tally counts for spp and their respective size classes in boxes then record final counts for each in the circles when reach is complete.
- Species codes on backside of this sheet.
- Circles left empty are assumed as zero (0) count

	Size 1: 0-60mm (0-2.36 in)	**Size 2: 61-200mm** (2.40-7.87 in)	**Size 3: 201-300mm** (7.91-11.81 in)	**Size 4: 301-400mm** (11.85-15.74 in)	**Size 5: >401mm** (>15.78 in)
Species code:					
Species code:					
Species code:					
Species code:					
Species code:					
Species code:					
Species code:					
Species code:					
Species code:					

Comments:	Number of Netters:

DWQ Fish Field Sheet (back)

Reviewed by (initial): _____
Updated: 03/2020

DWQ Electro-shocking/Fish Tissue Collection Field Sheet

Please use a new sheet for each site (do not combine multiple sites on one sheet)

Site Name:		
Site ID:		
County:		
Date:		
Site Coordinates		
Latitude (N)	Longitude (W)	Other (UTM/Degree Minutes Seconds):
Electro-shocking Reach Length (m):		
Shocker Settings		
Shocking Time (s):		
Volts:		
Pulse Rate (Hz):		
Pulse Width (ms):		

ELECTRO-SHOCKING DATA

- Tally counts for spp and their respective size classes in boxes then record final counts for each in the circles when reach is complete.
- Species codes on backside of this sheet.
- Circles left empty are assumed as zero (0) count

	Size 1: 0-60mm (0-2.36 in)	Size 2: 61-200mm (2.40-7.87 in)	Size 3: 201-300mm (7.91-11.81 in)	Size 4: 301-400mm (11.85-15.74 in)	Size 5: >401mm (>15.78 in)
Species code:	◯	◯	◯	◯	◯
Species code:	◯	◯	◯	◯	◯
Species code:	◯	◯	◯	◯	◯
Species code:	◯	◯	◯	◯	◯
Species code:	◯	◯	◯	◯	◯
Species code:	◯	◯	◯	◯	◯
Species code:	◯	◯	◯	◯	◯
Species code:	◯	◯	◯	◯	◯
Species code:	◯	◯	◯	◯	◯

Comments:	Number of Netters:

Figure 1b. DWR Fish Field Sheet

Fish Tissue Collection Field Sheet

Please use a new sheet for each site (do not combine multiple sites on one sheet)

Site Name:		
County:		
Date:		
Site Coordinates		
Latitude (N)	Longitude (W)	Other (UTM/Degree Minutes Seconds):

Fish Sample Information

Sample ID*	Length (mm)	Weight (g)	Comments
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			If there are more than 21 samples, use another sheet and staple all the sheets together.

*Sample ID= Species code (listed below)-Unique sequence ID per site (CTT01, CTT02, CTT03, CTT04, CTT05, RBT06, RBT07, RBT08….)

Collectors Names: _____ _____ _____

Species Codes:

Black bullhead (BBH)	Desert sucker (DSS)	Tiger muskie (TGM)
Black crappie (BLC)	Flannelmouth sucker (FLS)	Tiger trout (TGT)
Bluehead sucker (BHS)	Green sunfish (GSF)	Utah chub (UTC)
Bluegill (BLG)	Kokanee (KOK)	Wiper (WIP)
Bonneville whitefish (BWF)	Lake trout (LKT)	
Bonneville cisco (BCI)	Largemouth bass (LMB)	
Brook trout (BKT)	Mountain whitefish (MWF)	
Brown trout (BRT)	Mountain sucker (MTS)	
Burbot (BUR)	Rainbow trout (RBT)	
Channel catfish (CCF)	Roundtail chub (RTC)	
Colorado pikeminnow (CPM)	Smallmouth bass (SMB)	
Common carp (CMC)	Splake trout (SPT)	
Cutthroat trout (CTT)	Striped bass (STB)	

Figure 2. Field sample label.
(U:\WQ\PERMITS\MONITORS\Labels\UCASE Labels\ UCASE-Fish Collection Labels)

FISH COLLECTION
Field preservation: dry-ice. Long-term storage: freezer

Site Name:_____

Site Code:_____ Samplers:_____

Length (mm):_____ Weight (g):_____Date:_____

Fish ID:_____
(Species code-Fish sequence#)(ex: CTT01, CTT02, CTT03…)

Figure 3. Procedure for removing fillet from whole fish. Taken from Oregon Department of Fish & Wildlife website (How to clean and keep your catch).

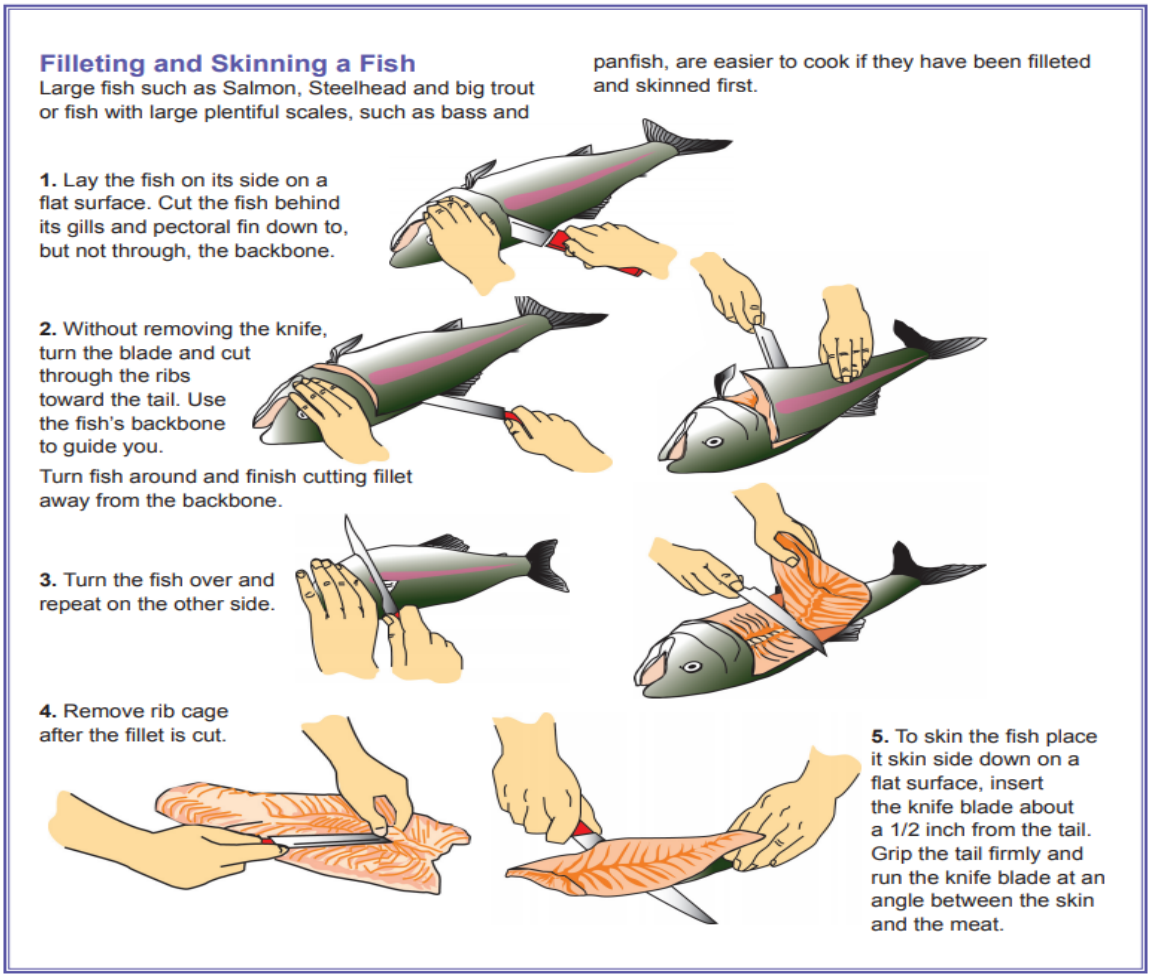

Figure 4. Example of electronic field inventory form.

Site Name: **Latitude/Longitude:** **Date:**

Sampler Last Name:	Site Description:	DWQ Site ID:	Length of transect:	Fishing Duration:	Gear:	Water visibility:
Comments:						

Fish Data:

Sample Count	Species	Fish ID Station ID + Species ID + Sample count (2 digits), example: 591322RBT01	Fish length	Fish weight
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				

Species:	Species ID:
Black crappie	BLC
Bluegill	BLG
Bonneville whitefish	BWF
Bonneville cisco	BCI
Brook trout	BKT
Brown trout	BRT
Channel catfish	CCF
Common carp	CMC
Cutthroat trout	CTT
Green sunfish	GSF
Kokanee	KOK
Lake trout	LKT
Largemouth bass	LMB
Mountain whitefish	MWF
Mountain sucker	MTS
Rainbow trout	RBT
Smallmouth bass	SMB
Splake trout	SPT
Striped bass	STB
Tiger muskie	TGM
Tiger trout	TGT
Utah sucker	UTS
Wiper	WIP
White bass	WHB
Walleye	WLE
Yellow perch	YLP

Figure 5. Tube label.

(U:\PERMITS\MONITORS\Fish Tissue Contamination Program (UTFTIS)\Labels)

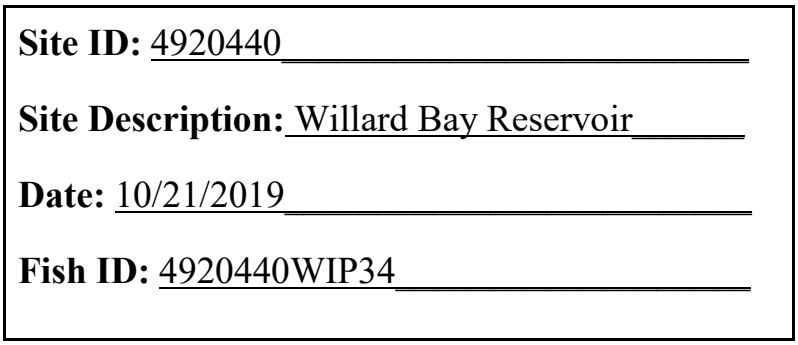

Figure 6. Example Chain of Custody form for EPA Region 8 Laboratory.
(U:\PERMITS\MONITORS\Fish Tissue Contamination Program (UTFTIS)

CHAIN OF CUSTODY

Statewide Fish Tissue Analysis
Project Name: Utah Fish Tissue
State of Utah DEQ/DWQ
Number of Vials in Shipment: _____
Preservative: Frozen
DWQ Site ID(s): _____
_____

Site ID	Date Collected	Unique Fish ID	Date Processed	Analyte	Comments
4923810	5/15/2017	4923810BLC01	1/25/2018	Hg	Note replicate

Sender's Name (signature): _____ **Shipped via Fedex**
Sender's Name (print):_____
Sender's Title:_____
Sender's Phone:_____
Division of Water Quality
195 N 1950 W
Salt Lake City, UT 84116
Date: _____

Figure 7. Chain of Custody seal for EPA Region 8 Laboratory.
(U:\PERMITS\MONITORS\Labels)

14.0 APPENDIX

Appendix 1 - SOP Acknowledgment and Training Form

SOP Acknowledgement Form

This SOP must be read and acknowledged annually, and this form must be kept on file at DWQ.

Document Title:	
Document Revision Number:	
Document Revision Date:	

Please sign below in accordance with the following statement:

"I have read and understood the above referenced document. I agree to perform the procedures described in this SOP in accordance with the document until such time that it is superseded by a more recent approved revision."

Date	Printed Name	Signature

SOP Training Form

Training is required for all new samplers and Refreshers are required annually.

Trainee: Sign below to acknowledge that training on this SOP was received, understood, and all questions/concerns were addressed by the trainer.

Trainer: Sign below to acknowledge that training on this SOP was completed for the individual listed and that trainee is competent to perform the procedures described within.

Date	Trainee Printed Name	Trainee Signature	Trainer Printed Name	Trainer Signature
Management Approval				
Printed Name:				
Signature:				
Date:				