

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

State of Utah
Department of Environmental Quality
Division of Water Quality



Prepared in Cooperation with:
Utah Public Health Laboratory – Utah Dept. of Health
&
EPA Region 8 Laboratory

Revision 2.2
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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 the author or by DWQ. Additionally, any distribution of this SOP does not constitute an endorsement of a particular 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.¹

¹ *Disclaimer language above adapted from Washington State Department of Ecology SOPs.*

REVISION PAGE

Date	Revision #	Summary of Changes	Sections	Other Comments
6/1/12	1	not applicable	not applicable	Previous version was put into new standardized format, QC section was revised, equipment checklists updated, began document control/revision tracking.
6/11/12	2	Removed entire homogenization step and associated equipment decontamination steps. Removed following QC samples: acid blanks, sample blanks.	Section 9 Section 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	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.	Section 4 Section 9	
5/1/14	2.2	Added acid blanks. Changed fish size collected to be based on consumed size rather than strict lengths. Minor editorial changes.	Section 11	

EXTERNAL REVIEWERS

Utah Public Health Laboratory

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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 for primarily mercury analysis, but can also be used for parameters like selenium and PCBs. 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 methylmercury, an organic mercury compound (EPA, 2010). Methylmercury exposure can cause impaired neurological development in fetuses, infants, and children. As a result, the 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 <http://www.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 mercury is detectable in fish tissue because of bioaccumulation. For this reason, fish serve as key indicators of waterbodies contaminated by mercury as well as the primary human exposure route.

The Utah DWQ began collecting fish tissue samples for mercury analysis as part of the Utah Comprehensive Assessment of Stream Ecosystems Program (UCASE) in 2000 and has sampled each year thereafter. DWQ partners with the Utah Division of Wildlife Resources (DWR) for fish collection and with either the Utah Department of Health - Division of Epidemiology and Laboratory Services (hereafter referred to as the State Lab) or an equivalent laboratory (such as the USEPA Region 8 Laboratory) for sample analysis. This SOP outlines the methods used by the DWQ and DWR for the collection and preparation of fish tissue samples prior mercury analysis in the laboratory.

2.0 SUMMARY OF METHOD

Depending on the waterbody, fish samples can be collected by electro-shocking, gill netting, fyke netting, or using hook-and-line. A minimum of five fish of each species are required for a statistically significant comparison to human health criteria. After collection, the length, weight, and species are recorded and each specimen is given a unique identification number made up of a seven digit STORET number for the site (also called a site code, site ID, or Monitoring Location ID), the fish species ID code, and fish sequence number (e.g. 4956600CTT01). The whole fish or fillet is wrapped in aluminum foil, labeled, placed in a zip-top plastic bag, and stored on dry ice. Regular ice can be used temporarily if dry ice is not available. The sample is placed in a freezer as soon as possible and frozen until a tissue sample can be prepared by DWQ personnel in a laboratory space such as DWQ's "Shop" wet lab. Samples are analyzed at the State Lab or at another equivalent lab (such as the USEPA Region 8 Laboratory). 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, fish weight, collection site, date and time, 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 analysis (or shipped on ice to another equivalent laboratory 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

TB: tube blank

PET: polyethylene terephthalate

Piscivorous: fish-eating

in: inches

ml: milliliters

µl: microliters

mm: millimeters

4.0 HEALTH AND SAFETY WARNINGS

- Field team members should take appropriate precautions when operating watercraft and working on, in, or around water.
- Field team members should use caution when electro-shocking for fish (see the UCASE Field Manual for more safety information).
- Field team members and sample processors should use caution when handling fish as the fins, gills, and/or teeth of some species may be sharp.
- Fish tissue sample processors should use caution when using scalpels and nitric acid. Sample processors must wear safety glasses/goggles, gloves, and lab coats.
- Fish tissue sample processors, if using State Lab benchspace and reagents, must follow any additional safety procedures required by the State Lab.

5.0 CAUTIONS

It is absolutely critical to follow appropriate quality control procedures throughout the sample collection and tissue preparation process. 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.

6.0 INTERFERENCES

Methylmercury, selenium, and PCBs (polychlorinated biphenyls) analysis in fish tissue are highly sensitive analyses 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.

7.0 PERSONNEL QUALIFICATIONS/RESPONSIBILITIES

Fish sample collectors and fish tissue sample processors must read this SOP annually and acknowledge they have done so via a signature page (see **APPENDIX**).

Additionally, each new fish tissue sample processor will be trained on this SOP by an experienced team member. The signature page will be signed by both sample processor and trainer to confirm that training was successfully completed and that the new sample processor is competent in carrying out this SOP.

The above-mentioned signature page will be kept on-file at DWQ along with the official hard copy of this SOP.

8.0 EQUIPMENT AND SUPPLIES

Equipment/supply checklists for the field and laboratory tasks described in this SOP are included below.

FIELD (for sample collection):

- | | |
|--|----------------------------|
| _____ Copy of this SOP | _____ Fish measuring board |
| _____ GPS Unit | _____ Clear tape |
| _____ Fish weigh scale | _____ Waterproof pen |
| _____ Plastic bags/trash bags | |
| _____ Coolers with dry ice or regular ice | |
| _____ DWQ fish field sheet (Figure 1) | |
| _____ DWQ fish sample labels (Figure 2) | |
| _____ Nitrile gloves | |
| _____ Heavy duty aluminum foil | |

_____ Fish collection gear (nets, electro-shocker, etc.)

LABORATORY (for sample processing):

- _____ Copy of this SOP
- _____ Cooler(s) containing fish to be processed
- _____ Cooler containing ice only (for processed samples)
- _____ Nitrile gloves
- _____ Sodium bicarbonate (baking soda)
- _____ Safety glasses/goggles
- _____ Scalpel handle and stainless steel blades (size 21)
- _____ Metal laboratory scoop or spatula (“scupula”)
- _____ Heavy duty aluminum foil
- _____ 10 percent nitric acid rinse made from ultra-pure certified trace-metal grade concentrated nitric acid and laboratory grade deionized water (prepared in 500-mL Teflon wash bottles)
- _____ Laboratory-grade deionized water (from a DI water tap)
- _____ Teflon wash bottles (fill with the 10% nitric acid solution before beginning procedure)
- _____ Micropipetter and disposable pipette tips (for 100 µl)
- _____ Sterile 15 ml PET centrifuge tubes (Fisher cat# 05-539-1) and tube racks
- _____ Sample Analysis Lab Request forms for State Laboratory (**Figure 6**) or Chain of Custody forms (**Figure 7**) and seals (**Figure 8**) for EPA Laboratory
- _____ Tube labels (**Figure 5**)
- _____ Laptop loaded with Excel file (**Figure 4**)

9.0 PROCEDURES

9.1 Field Collection Methods

9.1.1 Stream Collection

Five individuals from each consumable piscivorous fish species is the minimum requirement for comparison to human health criteria (EPA, 2000). Fish can be collected using electro-shocking methods (Peck et al., 2006). When electro-shocking, the crew works upward through the reach utilizing a one-pass method to catch, identify, and measure all collected fish while transporting a small live well for storing five fish for further tissue analysis. The objective of the one-pass method is to determine the variety of species present and to obtain fish for tissue samples. As data are recorded, the size classes of common sport species present in the stream can be determined. Once dominant sport species are determined, five 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. Experienced samplers will use their best professional judgment in this determination. 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 five fish in the desirable size-range are collected.

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 Lake Collection

Fish in lakes are collected using gill nets, fyke nets, and/or hook and line. The preferred sample set from lakes and reservoirs includes tissue samples from ten individual fish of the size people are most likely to consume from that particular waterbody (see **Section 9.1.1** above for general size categories). Experienced DWR personnel will use their professional judgment in making this determination. Lakes with multiple dominant species should include fish from the pelagic zone and bottom feeding fish, and especially piscivorous species. Lakes may have multiple pelagic species; therefore, ten individuals from at least two 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. The number of sampling sites on each lake is determined annually during development of the sampling plan.

Gill nets are generally set on lakes and reservoirs in cooperation with DWR. The net is deployed overnight and pulled early in the morning. At each net location, DWR fish sample collectors record the name of the lake or reservoir, latitude and longitude of the net placement, the date collected, and notes of any unusual circumstances. 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. The retained fish are processed as described in **Section 9.2**. Fish collectors should record all field data on the field form included in **Figure 1**.

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.² Make sure entries on sample label completed for each individual fish 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 gallon-sized zip-top bag or heavy-duty trash bag if very large. Immediately place the sample on dry ice. If dry ice is not available, place the sample on regular 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 mercury 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. Stainless steel scalpels, acid rinses, a plastic cutting board, and ultra-purified deionized water are required. Preparation and planning are necessary to assure that all equipment and decontamination supplies are available. If filleted samples are necessary, the DWQ Monitoring Section Manager must be contacted for further detailed instructions. The following is the procedure for fillet preparation in the field:

1. Complete steps 1 through 4 described in **Section 9.2.1**.
2. Follow the steps presented in **Figure 3** for cutting the fillet (EPA, 1991).
3. Complete steps 5, 6, and 7 described in **Section 9.2.1**.

9.3 Preparation of Fish Tissue for Lab Analysis

Preparation of tissue samples from whole fish or fillets is performed in the Utah State Laboratory Environmental Sample Receiving Room, in the DWQ Building 1st floor

² DEQ samplers label with site code (STORET or MLID), species code, and fish number. DWR samplers may not use a site code when labeling fish; they may record the name of the lake or reservoir, the date, and the fish species. DEQ will retroactively assign/create a site code for that sample once DWQ enters the sample metadata in the water quality database.

laboratory, or in the DWQ “Shop” wet lab. The processing space must have clean counters, a sink, and the other items listed in **Section 8.0**. Holding time for fish samples prior to tissue preparation is 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. Whole fish sample preparation includes the following steps:

1. Set up laptop and open a preloaded Excel file containing all the samples to be processed that day (**Figure 4**). This file should be created in the office prior to the day of fish processing. To create this file, transfer the sample metadata (fish ID’s, collectors name, site name, site code, collection method, date, etc.) from the field sheets to the Excel file. This file helps to keep track of which fish have been processed, ensures that all fish expected from the field sampling have been accounted for, and serves as an input file for the fish sample metadata to be uploaded into the water quality database.
2. Remove the frozen samples from the freezer and 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 opened on the laptop.
4. Label sterile 15 ml PET tubes such that the following info is included: site code; site description; date collected; sampler(s); unique fish ID (see **Figure 5** for tube labels).
5. All individuals handling fish must wear clean nitrile examination gloves, safety glasses/goggles, and lab coats. Replace gloves between each processed fish.
6. Pour the box of sodium bicarbonate 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 scupula by rinsing them with laboratory grade deionized water followed by a 10% nitric acid solution rinse followed by another laboratory grade deionized water rinse. Throughout the procedure, perform acid rinsing in the sink, allowing the rinsate to contact the sodium bicarbonate in order to neutralize the acid before it runs into the sink drain.
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 back bone. Cut to the rib cage but not into the body

cavity. Cut out a rectangular chunk of muscle that will allow for at least 1 gram 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 scupula 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 inside a cooler partially filled with ice. 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”). Be careful to maintain all labeling.
14. Decontaminate equipment between samples. Rinse the scalpel/blade and scupula with DI water, then acid from the wash bottle acid, and then rinse with DI again. Change the scalpel blade only if it gets dull or 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. Fill out and submit a laboratory request form to the Environmental Sample Receiving Room staff if samples are to be analyzed by the State Laboratory (**Figure 6**). If samples are to be analyzed by the EPA Region 8 Laboratory, prepare a Chain of Custody form (**Figure 7**), package the frozen tubes on ice packs along with a return address label, tape up the cooler, and attach a Chain of Custody seal (**Figure 8**). Ship the cooler to Jack Sheets at the USEPA Region 8 Lab, 16194 West 45th Dr, Golden, CO, 80403, (303) 312-7793. If samples are not going to be shipped immediately, they must remain frozen until shipped.

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). The methodology and quality assurance and quality control procedures for this analysis and analyzing laboratories can be obtained from:

Utah Public Health Laboratory
4431 South 2700 West
Taylorsville, UT 84119
(801) 965-2400
UPHL@utah.gov

OR William Batschelet, Quality Assurance Officer
USEPA Region 8 Laboratory
16194 West 45th Dr
Golden, CO 80403
(303) 312-7792
r8eisc@epa.gov

NOTE: *The sample processing procedure described in this SOP can also be used to prepare tissue samples for selenium analysis. Selenium tissue analyses are performed by the USEPA Region 8 (above).*

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 assigned responsibility for entering the field data for mercury 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 are: site name, site code, gear, sample count, unique fish ID, length, weight, and sampler(s).

Laboratory results for blanks (discussed below) 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.

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 mercury to fish tissue samples. This blank also tests the processing lab's DI water for mercury 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 laboratory-grade deionized water directly from the sink tap and label the tube with the lot number and date. Labeling example: 03032011TBLot3452 (Tube blank performed on March 3, 2011 for a new package of tubes with the lot number 3452)

3. Using the micropipetter and tips, preserve the sample by adding 100 μ l of 10% nitric acid to the sample tube. Replace the lid and mix briefly.
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 (**Figure 6**). The lab sheet should indicate the sample ID from the 15 ml tube.
6. Discard used nitrile gloves and pipette tip.

11.2 Acid/DI Water Blanks

At the start of each day of fish tissue processing, either one or two acid rinse blanks are prepared (depending on the number of wash bottles used). The purpose of the acid blank is to ensure that: 1) the dilute 10% nitric acid used for rinsing and decontaminating equipment is not contaminated with mercury, 2) the DI water used as the diluent is not contaminated with mercury, and 3) the Teflon wash bottles containing the acid rinse are not contaminated with mercury.

1. Put on a clean pair of nitrile gloves.
2. Using the marks on the graduated 15 ml tube, fill the tube with 10 ml of the 10% nitric acid rinse from the Teflon wash bottle.
3. If more than one Teflon bottle is used, perform the previous step for each wash bottle.
4. Label the sample tube(s) with the Teflon wash bottle number and the date. For example: 03032011AB1 (Acid blank performed from Teflon wash bottle #1 on March 3, 2011).
5. Place the sample in the tube rack inside the cooler with the other fish tissue samples.
6. Fill out a lab sheet for each blank (**Figure 6**). The lab sheet should indicate the sample ID from the 15 ml tube.
7. Discard used nitrile gloves.

11.3 Duplicates

One duplicate should be prepared on each day of sample processing. The purpose of a duplicate is 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 as a duplicate using the date and the letter D. Labeling example: 03032011D (Duplicate performed on March 3, 2011)
3. If sending samples to the State Lab, fill out a lab sheet for each duplicate (**Figure 6**). The lab sheet should indicate the sample ID from the 15 ml tube.

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.

EPA. 1998. Method 7473: Mercury in solids and solutions by thermal decomposition, amalgamation, and atomic absorption spectrophotometry. U.S. Environmental Protection Agency, Office of Solid Waste. Washington, DC.

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

Reviewed by (initial): _____ Updated: 03/2011					
<u>DWO Electro-shocking/Fish Tissue Collection Field Sheet</u>					
Please use a new sheet for each site (do not combine multiple sites on one sheet)					
Site Name:					
STORET # (not applicable for DWR personnel):					
County:					
Date:					
GPS Coordinates		Degrees	Minutes	Seconds	Other (decimal degrees/UTM)
Datum:	Latitude				
	Longitude				
Reach Length (m):					
Shocker Settings					
Shocking Time (s):					
Volts:					
Pulse Rate (Hz):					
Pulse Width (ms):					
1. Tally final count for each species and their appropriate size in the circles. 2. Species codes on backside of this sheet	Size 1: 0-60mm (0-2.36 m)	Size 2: 61-200mm (2.40-7.87 m)	Size 3: 201-300mm (7.91-11.81 m)	Size 4: 301-400mm (11.85-15.74 m)	Size 5: >401mm (>15.78 m)
Species code:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Species code:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Species code:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Species code:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Species code:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Species code:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Species code:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Species code:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comments:				Number of Netters:	

DWQ Fish Field Sheet (back)

Reviewed by (initial): _____
 Updated: 03/2011

Fish Tissue Data (Hg)

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=STORET-Fish Code (listed below)-Unique Sequence ID per Site (i.e. 4982100CTT01)

Collector(s) Names (for Hg collection only):

Species Codes:

Black bullhead (BBH)	Least chub (LEC)	Utah sucker (UTS)
Black crappie (BLC)	Leatherside chub (LSC)	Virgin spinedace (VSD)
Bluehead sucker (BHS)	Longnose dace (LND)	Walleye (WLE)
Bluegill (BLG)	Mountain whitefish (MWF)	Wiper (WIP)
Bonneville whitefish (BWF)	Mountain sucker (MTS)	White bass (WHB)
Bonneville cisco (BCI)	Mottled sculpin (MOS)	Woundfin (WFN)
Brook trout (BKT)	Paiute sculpin (PTS)	Yellow perch (YLP)
Brown trout (BRT)	Rainbow trout (RBT)	
Channel catfish (CCF)	Redside shiner (RSS)	
Common carp (CMC)	Red-shiner (RES)	Note: Not all spp found in Utah are listed here. If crew collects a spp that is not listed then hand write the spp name on the front side of the sheet under "Species code"
Cutthroat trout (CTT)	Roundtail chub (RTC)	
Desert sucker (DSS)	Smallmouth bass (SMB)	
Flannelmouth sucker (FLS)	Speckled dace (SPD)	
Green sunfish (GSF)	Splake trout (SPT)	
Kokanee (KOK)	Striped bass (STB)	
Lake trout (LKT)	Tiger muskie (TGM)	
Largemouth bass (LMB)	Tiger trout (TGT)	

Figure 2. Field sample label. (U:\WQ\PERMITS\MONITORS\Labels\UCASE Labels\UCASE-Fish Collection Labels (5163or5523).doc)

FISH COLLECTION (Dry-Ice) Freezer in Shop	
Site ID:	_____
STORET:	_____
Samplers:	_____
Length (mm):	_____
Weight (g):	_____
Date:	_____
Fish ID:	_____
(STORET #;SPP;Fish Sequence #)(ex: 4959999CTT01)	

Figure 3. Procedure for removing fillet from whole fish.

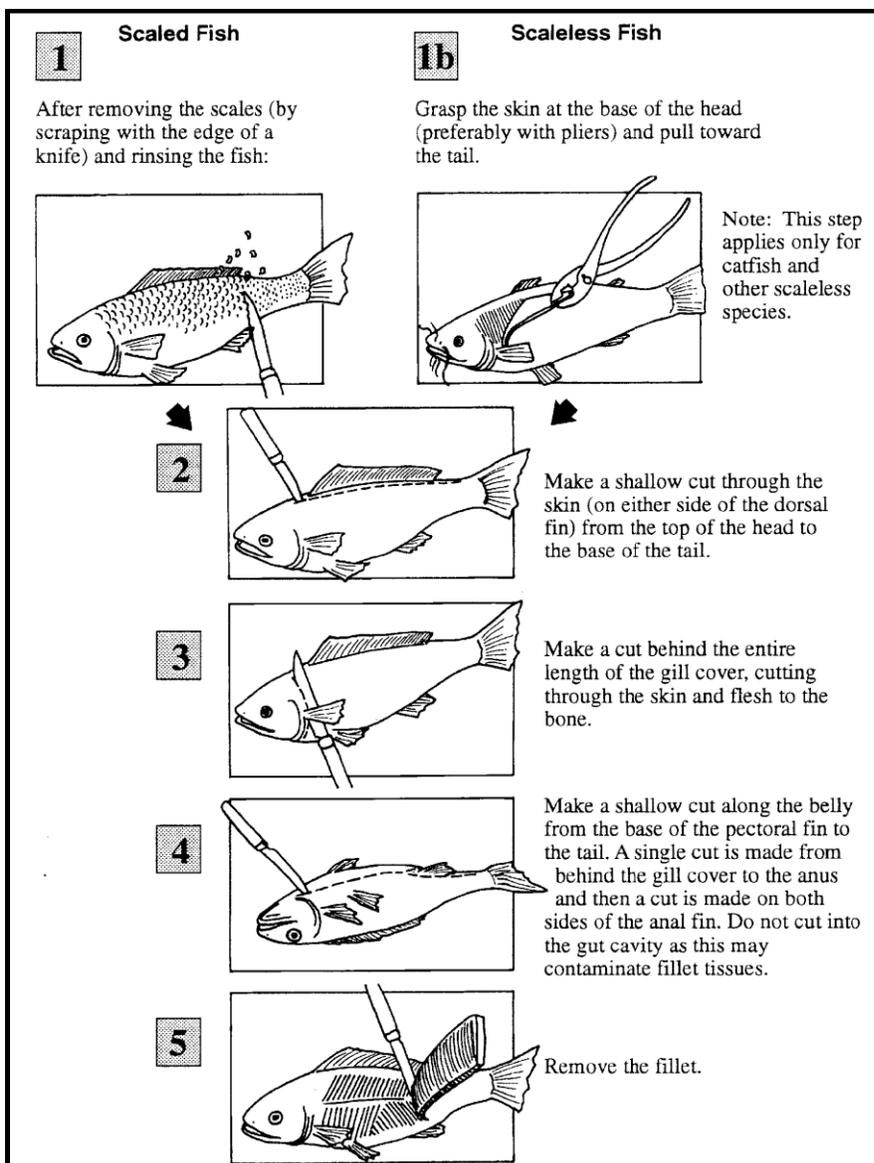


Figure 4. Example of electronic field inventory form preloaded onto laptop.

Site Name		Latitude	Longitude					
Date	Sampler Last Name		Site Description	Site ID (STORET #)	Length of transect fished	Fishing Duration	Gear	Water visibility
Comments								
		Fish ID = Station ID + Species ID + Sample count (2 digits), example: 591322RBT01						
Fish Data							Species	Spec ID
Sample count	Species	Fish ID	Fish length	Fish weight			Black bullhead	BBH
1							Black crappie	BLC
2							Bluegill	BLG
3							Bonneville whitefish	BWF
4							Bonneville cisco	BCI
5							Brook trout	BKT
6							Brown trout	BRT
7							Channel catfish	CCF
8							Common carp	CMC
9							Cutthroat trout	CTT
10							Green sunfish	GSF
11							Kokanee	KOK
12							Lake trout	LKT
13							Largemouth bass	LMB
14							Mountain whitefish	MWF
15							Mountain sucker	MTS
16							Rainbow trout	RBT
17							Smallmouth bass	SMB
18							Splake trout	SPT
19							Striped bass	STB
20							Tiger muskie	TGM
21							Tiger trout	TGT
22							Utah sucker	UTS
23							Wiper	WIP
24							White bass	WHB
25							Walleye	WLE
26							Yellow perch	YLP

Figure 5. Tube label. (U:\WQ\PERMITS\Brbrown\Fish Tissue Contamination Program)

STORET# _____	Date _____
Site Description _____	
_____ Samplers _____	
Fish ID _____	

Figure 6. Sample analysis request form for Utah Public Health Laboratory.

UTAH STATE WATER QUALITY SYSTEM MONITORING RUN PROGRAM			
MONITORING RUN: MERCURY IN FISH			
TRIP ID: ASSESSMENTA2005			RUN SEQUENCE NUMBER: 1
STORET: 0000000	LAB ID: [113]	TYPE: [4]	PROJECT: 555
DESCRIPTION: #			
COLLECTOR: [OSTERMILLER]	[] [] [] []		AGENCY: [] []
DATE: [] [] [] [] [] []		TIME: [] [] [] []	
	Y Y M M D D		
WEATHER CONDITIONS: [] [] / [] [] / [] []			
FIELD CONDITIONS: [] [] / [] [] / [] []			
FIELD TESTS			
AIR TEMP. (CELCIUS): [] [] . []		TRANSPARENCY (METERS): [] [] . []	
TEMPERATURE (CELCIUS): [] [] . []		CL. RESID: [] . [] []	
pH: [] [] . []		TURBIDITY (NTU): [] [] . []	
SP COND UMHOS/CM [] [] [] []		FLOW (MGD): [] [] [] . []	
SALINITY PPM: [] [] [] [] . [] []		FLOW (GPM): [] . [] []	
% D.O. SATURATION: [] [] [] . []		FLOW (CFS): [] [] [] [] [] [] . []	
D.O.: [] [] . []		FLOW ESTIMATED: []	MEASURED: []
DEPTH: (METERS) [] [] [] . []			
METHOD: Mercury FishTissueTube	TEMP:	pH:	COMMENTS:
FIELD COMMENTS:			

WEIR TYPE _____	PIPE DIA _____	BUCKET SIZE _____	
WIDTH _____	DEPTH _____	SECONDS _____	
DEPTH _____	VELOCITY _____		
STR WIDTH _____			
DEPTH _____			
VELOCITY _____			

Figure 8. Chain of Custody seal for EPA Region 8 Laboratory.
(U:\WQ\PERMITS\MONITORS\QAQC\Chain of Custody Forms\Legal Chain of Custody)

State of Utah Department of Environmental Quality SAMPLE SEAL		STORET: _____ Sample ID: _____ _____ Date: _____ Time: _____ Bottle _____ of _____ Collected by: _____ (Signature)
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14.0 APPENDIX

