NORTH Dakota | Environmental Quality
Be Legendary.™

4201 Normandy Street
Bismarck, North Dakota 58503
Phone: (701) 328 -5150
Fax: (701) 328-5200

AUTHORIZATIONS

Title	Name	Signature
SOP Author	Joshua Wert	N/A
Program Manager	~~Aaron Larsen~~	

QUALITY CONTROL/QUALITY ASSURANCE DOCUMENTATION

Title: Collection and Processing of Fish Skin on Fillet Tissue Samples
Type: Standard Operating Procedure 7.14
Version: 3.0
Date: 01/22/2020
Author: Joshua Wert

REVISION HISTORY

Revision	Change Description	Date	Authorization
1	Department address updated	06/08/2023	

ACKOWLEDGEMENTS

(Place to acknowledge peer reviewer)

THIS PAGE LEFT INTENTIONALLY BLANK

TABLE OF CONTENTS

1.0 SCOPE AND APPLICABILITY

This document presents the North Dakota Department of Environmental Quality, Division of Water Quality's (DWQ) Standard Operating Procedure (SOP) for collecting and processing of fish skin on fillet tissue sample. This SOP applies to all DWQ field staff, non-DWQ cooperators, and citizen volunteers.

2.0 SUMMARY OF METHOD

Fish spend their entire life in a waterbody which makes them an important indicator of water quality, especially toxic pollutants. Toxic pollutants which may be present in the water column or the sediments at concentrations below our analytical detection limits may be exhibited in fish tissue analysis due to bioaccumulation.

Skin on fillet tissue samples is collected for the analysis of contaminates (e.g., pesticides, PCB's, mercury, trace metals) to identify health risk if consumed. Due to the sensitive nature of the analysis and potential impact on consumption it is imperative that clean samples are collected using identical protocols each time. A step-by-step guide for the proper collection, preservation, and shipment of these fish tissue samples is provided below.

A composite sample of similarly sized and like species of fish are collected and ground whole. The composite is mixed well, and a 500 to 1000 ml sample is placed in a glass jar with Teflon lid. The sample is labeled and immediately frozen to await chemical analysis.

Fish tissue sampling is conducted in conjunction with the North Dakota Game and Fish Department's (NDGFD) spring and fall spawning operations. Fish tissue sampling is also conducted throughout the summer months in conjunction with the NDGFD's test netting operations on specified lakes.

3.0 HEALTH AND SAFETY WARNING

Field personnel should take appropriate precautions when operating electrofishing gear on, in, or around the water. All sampling crews should be equipped with personal protective equipment (PPE). This equipment would include non-breathable waders, rubber gloves, eye protection, etc. When operating a boat, the North Dakota's boating laws and rules shall be followed by all field personnel.

Field personnel should be aware that hazardous conditions potentially exist at every waterbody. If unfavorable conditions are present at the time of sampling, the sample visit is recommended to be rescheduled. If hazardous weather conditions arise during

sampling, such as lightning or high winds, personnel should cease sampling and move to a safe location.

4.0 CAUTIONS

Wash and rinse all work surfaces and equipment that will encounter the fish or fillet (e.g., table surface, scaler, filleting knifes) between composite samples.

5.0 INTERFERENCES

Transport the samples to a laboratory and keep on ice (not frozen) prior to processing. Each sample must be processed within 48 hours of collection or sample is considered contaminated and is discarded.

6.0 PERSONNEL QUALIFICATIONS/RESPONSIBILITIES

All personnel collecting and processing fish skin on fillet tissue samples must read this SOP annually and acknowledge they have done so via a signature page (see Appendix B). New field personnel must also demonstrate successful performance of the method. The signature page will be signed by both trainee and trainer to confirm that training was successfully completed and that the new monitor is competent in carrying out this SOP. The signature page will be kept on-file at DWQ along with the official hard copy of this SOP.

7.0 EQUIPMENT AND SUPPLIES

Field Equipment and Supplies

_____ Copy of this SOP
_____ Fish measuring board
_____ Fish weigh scale
_____ Plastic bags
_____Coolers with ice or frozen gel packs
_____ Field data forms
_____ Sample labels
_____ Sample log forms
_____ Waders (when shocking use pvc coated chest waders)
_____ Raincoat
_____ Rubber gloves
_____ Pen
_____ Fish collection gear (nets, electrofishing gear, etc.) if necessary
_____ 5-gallon bucket

_____ Generator (if electrofishing)

Laboratory Equipment and Supplies

_____Knife(s)
_____ Sharpening stone
_____Meat grinder (Fleetwood Model T 22 Chopper) with stainless steel feed pan, cylinder, worm gear, blades, and sieve plate
_____ Stainless steel pan
_____ Acetone (reagent grade)
_____ Soap
_____ Sample containers (Qorpak, EPA Clean, 8-oz. glass jars with Teflon-lined cap)
_____ Sample labels
_____ Sample ID/Custody Report Forms
_____ Pen
_____ Latex gloves

8.0 FIELD PROCEDURE

Upon arrival to the sample site, establish which sampler is going to collect the fish sample.

The following fish species are collected, filleted, and composited for tissue contaminant analysis: walleye, bluegill, sauger, northern pike, bass, crappie, chinook salmon, rainbow trout, catfish, carp, sucker, drum, whitefish, perch, and goldeye.

If available, collect up to five fish of similar predetermined size ranges. Generally, fish are group in sizes ranging from 0-5", 15-20", 20-25", etc. Left-side fillets are collected from each species and size range, as described below in Part 5. One fish is considered acceptable, especially of the larger size ranges.

1. Collect Fish. Several methods of collection are acceptable. The methods most used are: 1) electro-fishing; 2) hoop netting; 3) trap netting; 4) gill netting; and 5) hook and line. Any method of collection is acceptable which provides fresh fish in good condition, without contamination from analyte compounds, or substances which interfere with analyte compound identification or analysis.

2. Record on a field data sheet the location, date, time, collection method, collector, and additional information the collector deems necessary (7.14.1).

3. Record fish data on the fish tissue collection data form (Figure 7.14.1). Data is collected from the fish that will be filleted for analysis. This data should include: 1) species identification; 2) total length; 3) total weight; and 4) notation of anomalous characteristics.

4. Fillet Fish: Wash and rinse all equipment that encounter the fish fillets (e.g., fish scalers, knives, etc.) with soap and water, rinse with clean water, and then acetone. Rinse the equipment between samples.

5. Wash and rinse all work surfaces and equipment which will encounter the fish or fillet (e.g., table surface, scaler, filleting knifes) between composite samples.

6. Fish Preparation: All fish, except for Ictalurids (catfish), are scaled prior to filleting. Fish are scaled carefully to not abrade the underlying tissue, thus permitting unnecessary contamination.

7. After scaling has been completed, cut doors ventrally behind the opercular flap from the nape to the top of the rib cage, cutting deep enough to reach the spinal vertebrae. Do not cut into the abdominal cavity. If organs or viscera are cut during the filleting process, the fillet and equipment are automatically considered contaminated. The fish is discarded, the equipment rinsed, and a new fish is started.

8. Cut posteriorly along the dorsal surface from the opercular cut to the caudal peduncle. Cut deep enough to reach the vertebrae on the anterior portion of the fish. Once past the anus, the knife blade can extend ventrally through the fish. The posterior portion of the fillet is cut following the vertebrae to the caudal peduncle.

9. Returning to the anterior portion of the fillet carefully cut along the top of the rib cage, extracting the bulk of the muscle tissue covering this area. As the muscle tissue thins appreciably, continue cutting downward to the bottom of the fish and then to the exterior. Continue this cut to the caudal peduncle.

10. Place each composite of fish to be analyzed in a resealable plastic bag and write the species, length increment, location, and date on the outside of the bag. Place the sample in a cooler with plenty of ice.

11. Transport the samples to a laboratory and keep on ice (not frozen) prior to processing. Each sample must be processed within 48 hours of collection or sample is considered contaminated and is discarded.

9.0 LABORATORY PROCEDURE

1. Prior to processing (grinding) the first sample and after processing each composite sample, wash the grinder assembly, collection pan, cutting board, and knives with hot tap water, rinse with acetone and allow to air dry.

2. Wear latex gloves when processing samples and change gloves between processing composite samples.

3. Cut up each fish into small pieces and pass through the grinder once.

4. Hand mix the composite sample until thoroughly homogenized, then pass through the grinder a second time.

5. Hand mix the sample a second time then fill a sample container with the sample (one pint of sample is equivalent to approximately 500 grams).

6. Label the sample container appropriately and fill out the Sample ID/Custody Report (7.14.2).

7. If the sample log form indicates a split sample be collected, fill a second sample container and label appropriately (Figure 7.14.3). Note: Fish tissue split samples should be identified with STORET number 389995.

8. Place the sample containers in the freezer prior to submitting the samples to the laboratory.

9. If another composite sample requires processing, repeat steps (1) through (7)

10.0 DATA AND RECORDS MANAGEMENT

Fish data will be recorded on the field form 7.14.1 (Appendix A). Once personnel reach the office, data recorded on the field form are entered into the DWQ Sample Identification Database (SID). Field notes should be used to record any quality control activity performed such as measurements taken by more than one sampler, or to record any sampling conditions that may have interfered with the data collected. Field forms and notes should be stored in the appropriate project folder at DWQ.

11.0 QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance and quality control (QA/QC) procedures will be followed as explained above. Individuals will have to follow the field and laboratory standard operating

procedures to comply with the QA/QC for collecting and processing fish skin on fillet tissue samples.

12.0 REFERENCES

National Rivers and Streams Assessment 2018/19: Field Operations Manual EPA-841-B-17-003a

Related DWQ SOPs

7.14 Fish Skin on Fillet Tissue Sample Collection

7.15 Fish Tissue Plug Samples for Mercury Analysis

APPENDIX A

Field Reporting Form

NORTH Dakota | Environmental Quality
Be Legendary.™

Biological Monitoring Site Form
Division of Water Quality
Watershed Management Program
Phone: 701-328-5210 Fax: 701-328-5200

Lab ID Number: _____ **Project Code**: _____

Project Description: _____

STORET No.: _____ **Waterbody Name**:

Location Description:

Date/Time Collected: _____**Date/Time Processed**: _____

Sampler(s):

Collection Method:

Species: _____ **Tissue Type**: _____

Comments:

Log #	Species Init.	Comp. Size	Sex(m/f/unk.)	Length(cm)	Min	Max	Avg	Mass(g)	Min	Max	Avg

Figure 7.13.1 Fish tissue collection field data form.

NORTH Dakota | Environmental Quality
Be Legendary.™

Biological Monitoring Site Form
Division of Water Quality
Watershed Management Program
Phone: 701-328-5210 Fax: 701-328-5200

Surface Water Sample Identification Code R (Tissue samples)
Samples received without this sheet or without all bold sections fully completed will be rejected and not analyzed.

Sample Collection/Billing Information			
Account #	**Project Code:**	**Project Description:**	
Customer (Name, Address, Phone):			
Date Collected:	**Time Collected:**	**Matrix:** Tissue	**Site ID:**
Site Description:			
Alternate ID:	**Collected By:**		
County Number:	**County Name:**		
Comment:			
Comment:			

Field Information/Measurements				
Species Name:	Species Code:	Tissue Type:		Sample Size:
Comment:		Min. Length (cm):	Max. Length (cm):	Ave. Length (cm):
		Min. Weight (g):	Max. Weight (g):	Ave. Weight (g):

Analysis Requested			
■ 76) Mercury			
■ 77) Base/Neut. Pest			
■ 78) Trace Metals			
■ 106) Acid Herbicides			
■ 107) PCBs			
■ 112) Urons			
■ 113) Carbamates			
■ 143) PAHs			

Figure 7.13.2 Fish sample custody form.

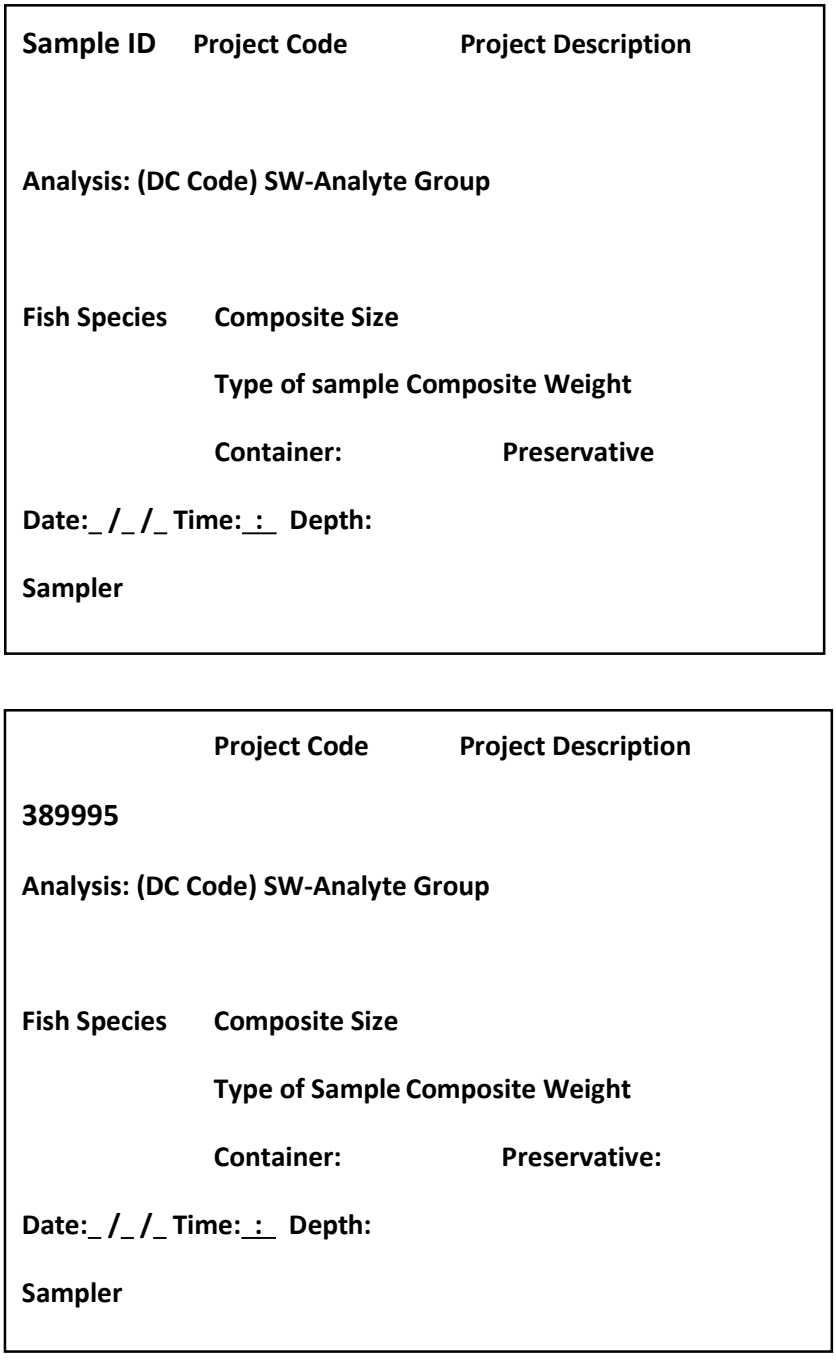

Figure 7.13.3 Fish flesh label, and fish flesh split label.

APPENDIX B

SOP Acknowledgement and Training Form

SOP Acknowledgement and Training Form

This SOP must be read, and this form signed annually. This form must be kept with the latest version of the SOP.

Document Title:	
Document Revision Number:	
Document Revision Date:	

Please sign below in accordance with the following statement:
“I have read and understand 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.”

Printed Name	Signature	Date

SOP Acknowledgement and Training Form (con't)

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 training is competent to perform the procedures described within.

Date of Training	Trainee Printed Name	Trainee Signature	Trainer Printed Name	Trainer Signature