

Pre-Return Flow Root River Data Collection Plan

Prepared for

Waukesha Water Utility

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Contents

Introduction and Purpose	1
Technical Approach.....	1
Data Collection Sites	1
Water Quality Sampling	6
Winter Water Quality Sampling.....	7
Field Equipment	7
Field Safety Instructions (FSI).....	8
Quality Assurance/Quality Control	8
Type 1—Field Surveys.....	8
Type 2—Field Sampling.....	8
Type 3—Laboratory Analysis	9
Biological Data Collection	10
Chain-of-Custody and Shipping.....	10
Chain-of-Custody Record	11
Custody Seals	11
Water Quality Sample Labeling and Shipment	11
Biological Sample Labeling and Shipment	12
Data Analysis and Reporting	13
Water Quality Data Analysis and Reporting	13
Biological Data Analysis and Reporting.....	13
References.....	14

Appendixes

- I Field Assessment Form
- II Sample Standard Operating Procedure (SOP)
- III Biological Data Collection Reach Maps
- IV Scientific Collectors Permit or Research License

Tables

- 1 Data collection site locations
- 2a Summary of UWP Parameters and Data Collection Activities
- 2b Summary of USGS Parameters and Data Collection Activities
- 2c Summary of Waukesha WWTP Parameters and Data Collection Activities
- 3 Parameters, Reporting Limits, and Methods

Figures

- 1 Data collection site locations
- 2 Photos of data collection site locations

Introduction and Purpose

The Root River flows through parts of Milwaukee and Racine counties, and into Lake Michigan at Racine, Wisconsin. The river has natural bottom substrate and vegetated river banks and it has a mixture of land uses between its headwaters and Lake Michigan. The headwaters of the Root River are moderately urbanized, the middle has significant agricultural uses, and the lower parts of the watershed near Lake Michigan are heavily urbanized. Return flow is proposed to enter the Root River in the middle reaches, containing primarily agriculture and lower density development, downstream of the confluence with the Root River Canal.

This document details the pre-return flow Root River Data Collection Plan. The plan includes water quality sampling and ecological assessment methodology to be utilized for data collection at eight sites along the Root River. The data collection will likely extend through several years. A future post-return flow monitoring plan is a condition of the Great Lakes – St. Lawrence River Basin Water Resources Council approval of a Lake Michigan water supply with return flow. The post-return flow monitoring plan will be developed at a later date.

As part of the Waukesha Water Utility return flow plan, the Pre-Return Flow Root River Data Collection Plan is intended to support baselining the river for pre-return flow water quality and biological conditions and Wisconsin Pollution Discharge Elimination System (WPDES) return flow permitting. CH2M is working with the City of Waukesha and the Program Manager/Construction Manager Great Lakes Water Supply Program Team (PM/CM team) in the development of this Pre-Return Flow Root River Data Collection Plan. This data collection plan will support site specific information on river flow and water quality conditions that may be used to determine return flow water quality limits. The data collection plan also supports understanding pre-return flow river water quality downstream of the return flow location.

Technical Approach

This data collection plan includes a standard methodology to conduct routine water quality data collection and biannual biological data collection. A habitat assessment was previously completed for the *Root River Watershed Restoration Plan* (SEWRPC, 2007), which has documented existing watershed assessment points. The data collection effort documented in this report will obtain water quality and biological data to support return flow to the Root River for the Waukesha Water Utility's Lake Michigan water supply. A description of data collection sites, parameters, frequency, quality assurance practices, and procedures for each data collection activity is described in the following subsections.

Data Collection Sites

A total of eight sites were identified as data collection locations (Figure 1 and 2; Table 1) along the Root River and Root River Canal. These sites were selected to coordinate with previous and ongoing data collection efforts by the United States Geological Survey (USGS), Wisconsin Department of Natural Resources (WDNR), and Southeastern Wisconsin Regional Planning Commission (SEWRPC) and to collect data that will best represent the current baseline conditions of the Root River in preparation for return flow.

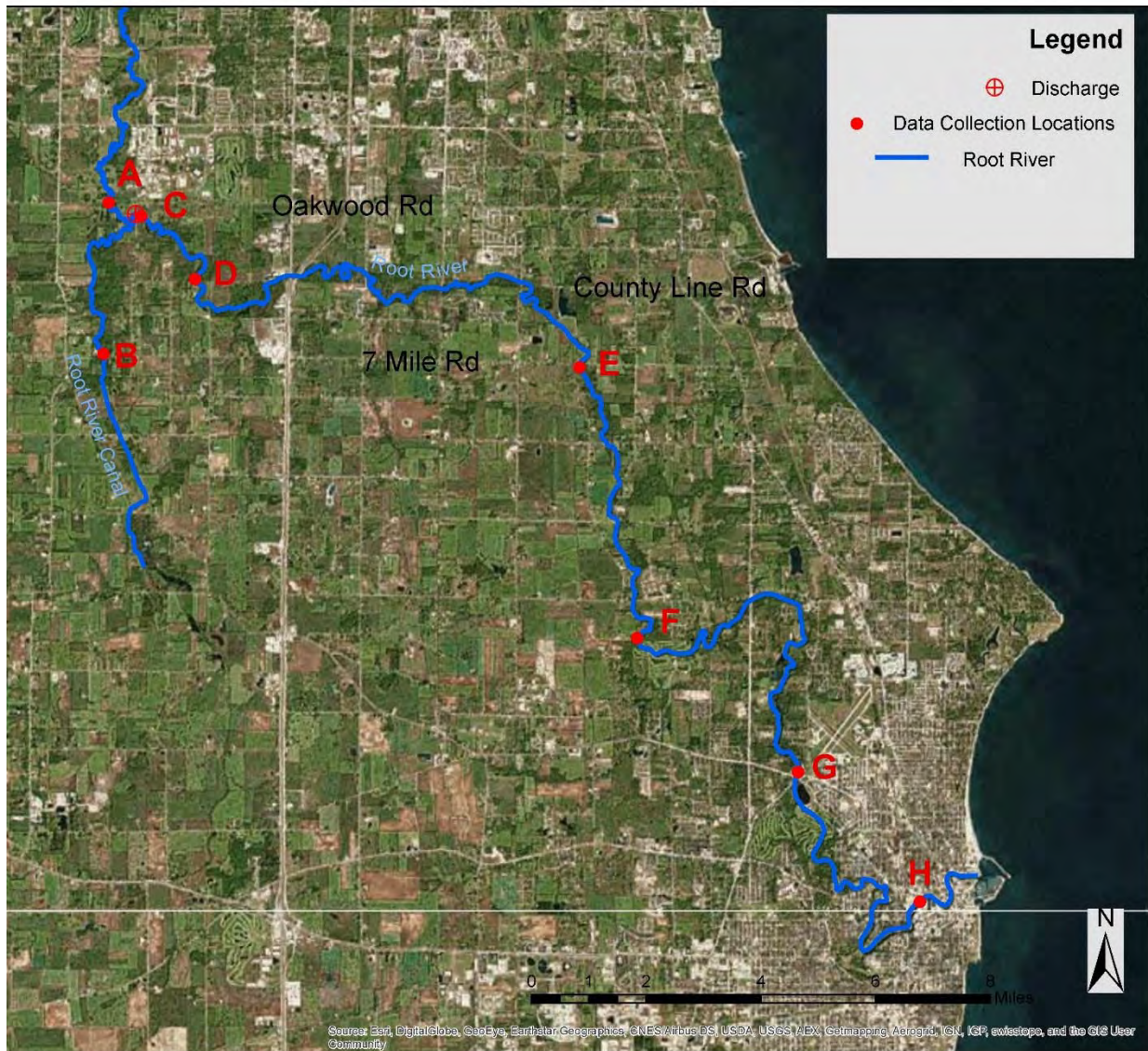


Figure 1. Data collection site locations.

Table 1. Data collection site locations.

Site ID	Location Description	Comment
A	Root River at Oakwood Rd	This data collection site is located on the Root River upstream of the confluence of the Root River and the Root River Canal. Temperature probes are located on the south side of culvert. Parking is accessible in a slightly steep grassy area on the side of the road. Data collection may be possible from the roadway or through an accessible grassy bank on the river. The river has muddy, soft substrate.
B	Root River Canal at 7 Mile Rd	This data collection site has fair accessibility sloping down to the river bank, but may be more difficult during slippery conditions. Parking is available slightly farther away from the bridge on the south side of the road in the grass. A USGS temperature probe is located on the south side of the bridge. A private residence is north of the bridge, so sampling is recommended on the south side to minimize residential disturbance. The river has rocky, gravel substrate.
C	Root River downstream of 60 th St Bridge; at proposed return flow outfall	This data collection site captures data following the confluence of the Root River and the Root River Canal. The WWU has a legal arrangement with the property owner for access. Parking is accessible in a gravel area on the side of the road. A USGS sampling shed is located on the east side of the bridge, on the south side of the river, where temperature and flow data is collected. There is good access via a path to the USGS gage station on the river bank. The river has muddy, soft substrate.
D	Root River at County Line Rd; downstream of proposed return flow outfall	This data collection location is 1.5 miles downstream of the proposed discharge location representing fully mixed conditions. Historic data has been collected at this location. Parking is slightly more difficult, but is available on the south side of the road. Access to the riverbank is possible, but difficult, through a steep and rocky section on the east side of the bridge. This may be more difficult to access in the winter months, and during slippery conditions. The river has muddy, soft substrate.
E	Root River at 7 Mile Rd	This data collection location has great accessibility near a mowed area on the south side of the bridge. There is a gravel area on the side of the road for accessible parking. The river is particularly wide here, so attention should be given to obtain representative samples depending on the river conditions. Historic data has been collected at this location. The substrate was not observed at this site.
F	Root River at Johnson Park	This data collection site is located off of a green steel bridge in the Johnson Park/Golf Course near the maintenance building. The site has good accessibility on the north side of the river and a small parking area is available near the Golf Course dumpsters. Historic data has been collected at this location. Permission for site access will be needed by from the Golf Course. The substrate was not observed at this site.
G	Root River DS of Horlick Dam	This data collection site is located on the main stem of the Root River immediately below the Horlick Dam. Parking is available at Water's Edge and from here the railing of a retaining wall at the dam can be seen. Along the railing is a steep but accessible pathway to the base of the dam. Historic data has been collected at this location and river flow is measured by USGS. The river substrate is mostly rock.
H	Root River at S Marquette St	This data collection site is located at the S Marquette St bridge between Liberty St and Water St. The area is highly urbanized and there is continuous traffic along S Marquette St. There is accessible parking along a side parkway to the Fifth Street Yacht Club. Data collection during ice conditions can occur on the sidewalk along the bridge.

Prior to commencing field activities, a communication execution plan shall be developed to communicate and receive approval for land access from private landowners.

(A) Root River at Oakwood Road



(B) Root River Canal at 7 Mile Road



(C) Root River on 60th Street bridge at return flow outfall



(D) Root River at County Line Road

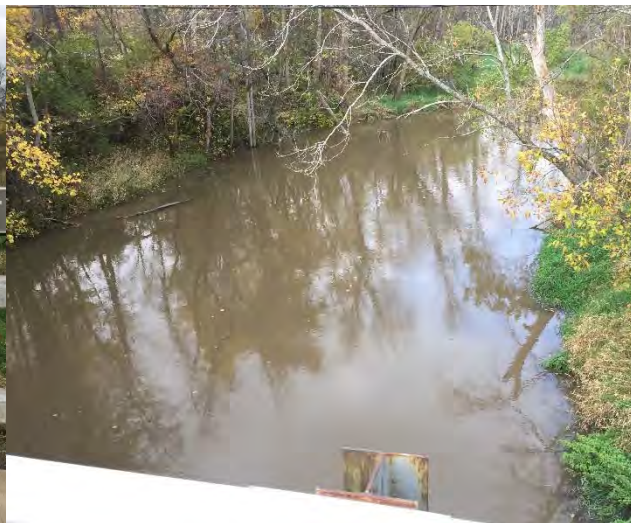


Figure 2. Photos of data collection site locations.

(E) Root River at 7 Mile Road



(F) Root River at Johnson Park



(G) Root River downstream of Horlick Dam



(H) Root River at S Marquette St



Figure 2 (cont.). Photos of data collection site locations.

Water Quality Sampling

Grab samples at data collection locations, shall be collected depending on the frequency of sampling for each parameter. Parameters sharing the same frequency should be measured during the same data collection event. It is recommended that water quality samples be collected in well-mixed stream flow, at approximately mid-stream and mid-depth, where feasible. Samples shall be collected upstream of road or bridge crossings when feasible. If not feasible, samples shall not be collected directly downstream of the crossing. Seasonal changes in the water level may require the use of a small boat if areas of the stream are determined to be unswadable.

Some parameters can be measured using automated sensors, and multi-parameter probes, and others can be calculated based on values recorded for related parameters. Commercially available multi-parameter probes include YSI, Hach, and Horiba brands. These brands typically offer an instrument base with multiple ports for desired parameters. Table 2 provides a summary of the parameters, the method of sampling, and the frequency and locations of data collection. The lead organizations are listed in each table, such as Table 2a University of Wisconsin-Parkside (UWP), Table 2b USGS, and Table 2c Waukesha wastewater treatment plant (WWTP).

Table 2a. Summary of UWP Parameters and Data Collection Activities

Water Quality Parameters	Frequency	Method	Data Collection Locations
<i>Chemical Parameters</i>			
Total Nitrogen	Twice per Month (May-October), Monthly (November-April)	Grab Sample	A-H
Total Kjeldahl Nitrogen (TKN)	Twice per Month (May-October), Monthly (November-April)	Calculation	A-H
Nitrate-Nitrite (NO ₃ - NO ₂)	Twice per Month (May-October), Monthly (November-April)	Grab Sample	A-H
Organic Nitrogen	Twice per Month (May-October), Monthly (November-April)	Calculation	A-H
Chlorophyll	Twice per Month (May-October), Monthly (November-April)	Grab Sample	A-H
Total Phosphorus (TP)	Twice per Month (May-October), Monthly (November-April)	Grab Sample	A-H
Orthophosphate	Twice per Month (May-October), Monthly (November-April)	Grab Sample	A-H
Biological Oxygen Demand (BOD)	Twice per Month (May-October), Monthly (November-April)	Grab Sample	A-H
Dissolved Oxygen (DO)	Twice per Month (May-October), Monthly (November-April)	Multi-parameter Probe	A-H
Ammonia-Nitrogen	Twice per Month (May-October), Monthly (November-April)	Grab Sample	A-H
Total Suspended Solids (TSS)	Twice per Month (May-October), Monthly (November-April)	Grab Sample	A-H
Specific Conductance	Twice per Month (May-October), Monthly (November-April)	Multi-parameter Probe	A-H
pH	Twice per Month (May-October), Monthly (November-April)	Multi-parameter Probe	A-H
Temperature	Twice per Month (May-October), Monthly (November-April)	Multi-parameter probe	A-H

Table 2a. Summary of UWP Parameters and Data Collection Activities

Water Quality Parameters	Frequency	Method	Data Collection Locations
Turbidity	Twice per Month (May-October), Monthly (November-April)	Multi-parameter Probe	A-H
Biological Parameters			
Macroinvertebrates	September-October; November	(WDNR, 2000)	A-D
Fish	June-August; November	(WDNR, 2001)	A-D

Table 2b. Summary of USGS Parameters and Data Collection Activities

Water Quality Parameters	Frequency	Method	Data Collection Locations
Parameters			
Flow*	15 Minute	Automated Flow Gage	C
Dissolved Oxygen	Hourly	Continuous Data Sonde	C
Specific Conductance	Hourly	Continuous Data Sonde	C
pH	Hourly	Continuous Data Sonde	C
Temperature*	Hourly	Continuous Data Sonde	A-D
Turbidity	Hourly	Continuous Data Sonde	C
*Initiated in Fall 2016			

Table 2c. Summary of Waukesha WWTP Parameters and Data Collection Activities

Water Quality Parameters	Frequency	Method	Data Collection Locations
Parameters			
Whole Effluent Toxicity (WET) Testing	Same as Fox River frequency for existing WWTP discharge	(WDNR, 2016)	C

Winter Water Quality Sampling

Reasonable efforts shall be implemented to conduct winter water quality sampling for open water or thin ice conditions. Coring through thick ice to retrieve water samples is not required. However, individual data collection sites should be observed and evaluated for the ability to conduct water quality sampling, and sampling shall continue at sites with favorable conditions.

Field Equipment

Equipment that will be used during water quality sampling is listed below. The list should be expanded to include bottle type and preservative for each parameter to be sampled after consultation with the laboratory. Equipment should be gathered, checked, and loaded into the vehicles prior to each event.

- PPE (gloves, safety glasses, etc.)
- Multi-parameter meter for in situ measurements
- Batteries

- Labeled water sample bottles from the laboratory
- Cooler with ice
- Chain-of-custody form
- Field assessment form (Appendix I)
- Field safety instructions

Field Safety Instructions (FSI)

Contractors shall develop and follow field safety instructions that cover data collection activities for at least two-personnel at all times, utilization of personal floatation devices, and expected field conditions that may pose a health or safety hazard. These instructions should be reviewed and agreed upon by all field personnel and should be included in the field equipment list.

Quality Assurance/Quality Control

QA/QC is designed to assure the reliability and quality of the analysis and data and to identify any contamination that may result from lab methods, equipment, or sample collection. Sample collection, preservation, handling and storage, and analytical procedures shall be conducted in accordance with standard methods and practices. Three types of QA/QC should be performed as part of the water quality data collection activities. Type 1 includes regular checks of water quality meters and proper documentation of activities and field conditions by the field team members. Type 2 consists of sampling procedures intended to identify the type and estimate the level of contamination. Type 3 provides confirmation of the analytical procedures conducted by the laboratories. In combination, these types of QA/QC provide the equivalent of a modified Level 3 EPA data quality objective.

Type 1—Field Surveys

Type 1 QA/QC encompasses field data collection activities and calibration of field equipment. Field personnel for this project should be experienced in the calibration and operation of each piece of field equipment used on the project, and should provide proposed Standard Operating Procedures (SOPs). A sample SOP is provided as Appendix II. Field instruments should be calibrated according to manufacturers' specifications, and these procedures shall be documented in a field notebook or on specially prepared field sheets. Type 1 activities include documenting other pertinent data concerning the data collection events such as weather conditions and time of data collection. Type 1 documentation can be summarized as follows:

- Instrument identification
- Calibration information (standards used and results)
- Date and time of calibrations
- Weather conditions and specific location of sample collection

Type 2—Field Sampling

Two personnel with experience or special training in water quality sampling techniques should conduct field sampling. Type 2 QA/QC activities include providing equipment decontamination SOPs to detail cleaning protocols between collections of water samples. Type 2 activities also include collection of QA/QC duplicate samples, and proper labeling of all samples. The Type 2 QA/QC requirements are detailed below.

- **Field Duplicates.** Duplicate field samples are collected side-by-side to check the homogeneity of the sample matrix, precision of field techniques, and precision of laboratory analysis. Duplicate samples are collected at the same time as the initial sample. The initial sample and the duplicate sample for

any one parameter shall be taken from the same water dip to compare precision of laboratory analyses. The duplicate sample will be handled in the same manner as the primary sample. The duplicate sample will be stored in an iced cooler, and shipped to the laboratory on the day it is collected. The duplicate sample is analyzed for the same parameters as the primary sample. The duplicate sample shall be labeled with “FD” in place of a Sample Site ID to remove site identification by the laboratory personnel. Sample collectors shall indicate the sample site where the duplicate was collected in the field forms along with the date and time of collection. At a minimum, one duplicate sample should be collected and analyzed at one sampling site for all grab sample parameters during every other sampling event.

Type 3—Laboratory Analysis

Laboratory analysis shall be conducted by a contracted laboratory using EPA-approved analysis methods (40 CFR Part 136). Certified water quality laboratories are listed under the *Wisconsin DNR accredited laboratories* and the web link is located in the References section. Samples shall be processed within the recommended hold times as listed in the standard methods, and attention should be given to the varying hold time limits for each parameter. The methods and detection limits that will be used for each parameter to document proper QA/QC are listed in Table 3. The same laboratories for water quality, WET testing, macroinvertebrate taxonomy, and fish taxonomy shall be utilized for one calendar year to maintain consistency. Plans to use a different lab shall be coordinated with the City of Waukesha and shall include a transition plan identifying an overlap period to evaluate potential discrepancies between the labs.

Table 3. Parameters, Reporting Limits, and Methods

Water Quality Parameters	Method	Laboratory Reporting Limit	Units
Total Nitrogen	USGS I-4650-03 or SM 4500-N org D (19 ed.)	0.03	mg/L
Total Kjeldahl Nitrogen (TKN)	Calculation (EPA, 2013)	-	mg/L
Nitrate-Nitrite (NO ₃ ⁻ NO ₂)	EPA 353.2	-	mg/L
Organic Nitrogen	Calculation (EPA, 2013)	-	mg/L
Chlorophyll	EPA 445.0	0.26	µg chl <i>a</i> /L
Total Phosphorus (TP)	EPA 365.1, 365.2, 365.3	0.005	mg/L
Orthophosphate	EPA 365.1, 365.2, 365.3	0.002	mg/L
Biological Oxygen Demand (BOD)	SM 5210B	2	mg/L
Dissolved Oxygen (DO)	Multiparameter Probe (e.g. Hach, YSI, Horiba)	0.01 (Horiba U-50 series)	mg/L
Ammonia-Nitrogen	EPA 350.1, EPA 350.3	0.015	mg/L
Total Suspended Solids (TSS)	EPA 160.2, SM 2540D	2	mg/L
Specific Conductance	Multiparameter Probe (e.g. Hach, YSI, Horiba)	0.001 (Horiba U-50 series)	mS/cm
pH	Multiparameter Probe (e.g. Hach, YSI, Horiba)	0.01 (Horiba U-50 series)	pH
Temperature	Multiparameter Probe (e.g. Hach, YSI, Horiba)	0.01 (Horiba U-50 series)	°C
Turbidity	Multiparameter Probe (e.g. Hach, YSI, Horiba)	0.1 (Horiba U-52 series)	NTU
WET Testing	(WDNR, 2016)		
Macroinvertebrates	(WDNR, 2000)		

Biological Data Collection

Biological data collection shall be conducted at data collection sites A-D to evaluate macroinvertebrate and fish populations and habitat conditions. During the first biological sampling event, a habitat assessment form should be completed addressing parameters from the *Guidelines for Evaluating Habitat of Wadable Streams* (WDNR, 2002). Biological forms will be provided with the data collection plan. Biological sampling reach maps are included as Appendix III. Prior to biological sampling of fish and macroinvertebrates, a Scientific Collectors Permit must be obtained from the WDNR, in addition to any other protocol approvals required within the permit. The Scientific Collectors Permit or Research License Application and Authorization is provided in Appendix IV.

Macroinvertebrates Sampling

- Biological data collection methods for macroinvertebrate sampling should adhere to the *Guidelines for Collecting Macroinvertebrate Samples from Wadable Streams* by the Wisconsin Department of Natural Resources (WDNR, 2000).
- Sampling should take place once during September through early October, and again during November to assess thermal impacts on macroinvertebrate populations. Sampling between locations should occur on consecutive days.
- Macroinvertebrate analysis shall be conducted by laboratories that are state-certified for taxonomic identification and enumeration:
 - UW-Steven's Point Aquatic Entomology Laboratory
Contact: Dr. Jeff Dimick jeff.dimick@uwsp.edu
 - UW-Superior's Lake Superior Research Institute
Contact: Dr. Kent Schmude kschmude@uwsuper.edu

Fish Sampling

- Fish sampling and data collection shall be conducted according to the *Guidelines for Assessing Fish Communities of Wadable Streams in Wisconsin* (WDNR, 2001) and *Using the Index of Biotic Integrity (IBI) to Measure Environmental Quality in Warmwater Streams of Wisconsin* (Lyons, 1992).
- Fish IBI analysis shall include 10 metrics and 2 correction factors including *Species Richness and Composition, Trophic and Reproductive Function, and Fish Abundance and Condition* (Lyons, 1992).
- Field sampling should be conducted twice a year: once between the months of June and late August, and again in November. Sampling between locations should occur on consecutive days.
- The WDNR shall be notified prior to each fish sampling event to oversee fish taxonomy, but will not physically collect samples or direct the processing following collection.

Chain-of-Custody and Shipping

Any sampling and analytical program must follow a system for sample control from collection to data reporting. This includes the ability to trace the possession and handling of samples from the time of collection through analysis and final disposition. The documentation of the sample history is referred to as "chain-of-custody." A sample is considered to be in a person's custody if it is: (1) in the person's

physical possession, (2) in view of the person after he/she has taken possession, (3) secured by that person so that no one can tamper with the sample, or (4) in a designated secure area. The following section details the chain-of-custody system which shall be followed by staff working with the data collection plan.

Chain-of-Custody Record

To establish the documentation necessary to trace sample possession from the time of collection, a Chain-of-Custody (COC) record, which can be obtained from the laboratory, shall be completed for every sample event. In order to maintain the COC record, every person who has custody of the sample at any time must sign, date, and note the time on the COC record. Samples should not be left unattended unless placed in a secured and sealed container with the COC record inside the container. The COC record shall include special instructions for the laboratory to follow which will be consistent with the contract. If discrepancies are identified, the Field Team Leader (FTL) shall inform the PM/CM team before the samples are analyzed.

Custody Seals

Custody seals are used to detect tampering with samples following collection, up to the time of analysis. When samples are packed for shipping, custody seals will be placed across the latch and across the lid opening of the coolers to confirm that they arrive at the laboratory unopened. The custody seal placed across the lid opening will be secured with strapping tape. The tape will be placed over the custody seal and wrapped completely around the cooler so that it remains closed during shipping.

Water Quality Sample Labeling and Shipment

For each water quality sample, the following information shall be clearly marked and labeled on the sample container:

- Water samples: “RR – Sample Site ID (A-H) – MMDDYYYY”
- Field duplicates: “RR – FD – MMDDYYYY”
- Time of sample collection
- Sampled by
- Analyses
- Preservative (if any)

During sampling, filled and labeled containers shall be stored in coolers on ice to maintain a temperature of less than or equal to four degrees Celsius. The coolers shall remain in the custody of the FTL until the end of the sampling event, and the samples should be shipped, transported, or delivered to a laboratory courier in a cooler, on ice. If used, glass containers shall be wrapped in bubble-wrap to prevent breakage. If samples are collected on Friday, the laboratories should be notified for Saturday delivery.

Coolers prepared for shipping shall be lined with a cooler liner and packed with ice in double-wrapped Ziploc bags so that movement of samples is minimized. A COC form shall be included in each shipment container describing: the type of sample, number of containers, type and kind of analysis, QA/QC instructions and samples, and special processing and handling procedures. Labeling and documentation of field duplicates should follow QA/QC procedures as described previously. It is imperative that the samples taken to fulfill the QA/QC requirements to be completed by the lab are included on the COC. The FTL will keep the copy of the COC form.

Biological Sample Labeling and Shipment

Benthic macroinvertebrate samples shall be placed in a tightly sealing plastic or wide-mouth glass jar and preserved with 70-75 percent ethanol after collection at each site. For each benthic macroinvertebrate sample, the following information should be marked on the outside of the jar:

- “RR – Sample Site ID (A-H) – MMDDYYYY”
- Time of collection
- Sampled by
- Analyses
- Preservative

In addition, a labeled tag shall be inserted into the benthic macroinvertebrate sample with the same information. Water-proof paper should be used to prepare the tag, and the labels on both jars and tags should be marked with indelible ink.

Benthic macroinvertebrate samples shall be stored in coolers and remain in the custody of the FTL until the cooler is full or ready for shipment. Coolers prepared for shipping should be packed to minimize movement of samples and should include vermiculite in case of any leakage. Each shipping container shall contain a COC form with the analytical directions for the laboratory. Samples should be shipped to the laboratory within 24 hours of collection. Samples that have not been analyzed within 24 hrs of collection shall receive fresh 70-75% ethanol for preservation.

Data Analysis and Reporting

Water Quality Data Analysis and Reporting

When water chemistry results are received from the laboratory, they should be input into a standard data collection template provided by the PM/CM team on behalf of the City of Waukesha and reported monthly. Calculations to determine parameter results should be completed, but no analysis or interpretation of the data is required. Field forms, COC forms, laboratory data sheets, and QA/QC sheets documenting the sample collection, sample handling and laboratory analyses during the prior month should also be provided with the monthly data. A transmittal memo shall be submitted with the monthly data and should include an executive summary for the sampling period detailing number of samples, dates collected, etc.

Biological Data Analysis and Reporting

Collected biological data shall be used to calculate metrics for the biological condition score for benthic macroinvertebrate and fish. All metrics and scores shall be calculated and measured according to the most recent WDNR protocols, referenced previously. Raw data and calculated metrics should be entered into data collection templates provided by the PM/CM team on behalf of the City of Waukesha and reported monthly.

Fish species, abundance, size, and weight should be provided as a summary of the fish biological data.

Habitat assessment forms, COC forms, laboratory data sheets, and QA/QC sheets documenting the sample collection, sample handling and laboratory analyses during the prior month should also be provided with the monthly data. A transmittal memo shall be submitted with the monthly data and should include an executive summary for the sampling period detailing number of samples, dates collected, etc.

References

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<http://dnr.wi.gov/topic/wastewater/WETguidance.html>

Wisconsin Department of Natural Resources (WDNR). *Wisconsin DNR accredited laboratories*.
<http://dnr.wi.gov/regulations/labCert/LabLists.html>

Appendix I
Field Assessment Form

Root River Data Collection, In-Situ Measurements

Air Temp (Degrees F): _____

Personnel: _____

Cloud Coverage: Clear Partial Full

Type of Sampling: Water Quality Fish Macroinvertebrates

Precipitation in last 24 hrs (inches) _____

WQ Meter: _____ Calibration Date: _____

Bank (L or R when looking downstream): _____

Meter Calibration: pH: _____ Conductivity (mS/cm): _____

Distance from Bank: _____

DO (mg/L): _____ Turbidity (NTU): _____

Field Duplicate Site: _____ Field Duplicate Date/Time: _____

Site	Date	Time	DO (mg/L)	Conductivity (mS/cm)	pH	Temp (Degrees C)	Turbidity (NTU)	Notes

Appendix II
Sample Standard Operating Procedure
(SOP)

Surface Water Sampling SOP

Purpose

This standard operating procedure (SOP) is applicable to the collection of representative liquid samples, both aqueous and non-aqueous from streams, rivers, lakes, ponds, lagoons, and surface impoundments. It includes samples collected from depth, as well as samples collected from the surface.

Equipment and Materials

The following materials are required to undertake this procedure:

- Dip sampler or direct sampler (e.g. clean glass or stainless-steel beaker)
- Sample containers adhering to laboratory specifications
- Appropriate meters for parameters
- Paper towels
- Cooler with ice
- Field notebook and waterproof and permanent markers
- Decontamination solution

Procedures and Guidelines

Prior to commencing the sampling event all field sampling equipment should be decontaminated. Calibrate all field measurement equipment before use. When sampling multiple points with common sample collection equipment, it is necessary to thoroughly decontaminate collection equipment between uses.

When collecting surface water samples, either by wading in the water body or aboard a vessel, the sampling event should always start downstream and work upstream to avoid contaminating un-sampled areas within the water body by disturbing the suspending the sediment.

When collecting the surface water sample, immerse the dip sampler, or otherwise, when using a direct method, a clean glass or stainless-steel beaker with the opening facing upstream to collect the sample volume.

Immerse the beaker gently into the water to avoid turbulence. Avoid collecting floating surface debris or disturbed bottom sediment in the water sample.

Gently pour the sample into appropriately labeled sample vials and bottles.

When multiple chemical analysis is scheduled, fill the prescribed sample bottles in the following order:

- VOC;
- Non-volatile organics;
- Inorganics; and
- Field parameters.

Once samples have been collected, the following procedure should be followed:

- Preserve the sample if appropriate, or use pre-preserved sample bottles. Do not overfill bottles if they are pre-preserved.
- Cap the container, place in the ice filled cooler and cool to four degrees Celsius.
- Record all appropriate data in the site logbook and on field data sheets.

- Complete the Chain of Custody record.
- Attach custody seals to cooler prior to shipment.
- Decontaminate all sampling equipment prior to the collection of additional samples with that sampling device.

Water quality measurements such as dissolved oxygen, pH, temperature, conductivity, and oxidation-reduction potential can assist in the interpretation of analytical data and the selection of sampling sites and depths when surface water samples are collected.

Key Checks and Preventative Maintenance

Generally, the deciding factors in the selection of a sampling device for sampling liquids in streams, rivers, lakes, ponds, lagoons, and impoundments are:

- Will the sample be collected from shore or from a boat?
- What is the desired depth at which you wish to collect the sample?
- What is the overall depth and flow direction of river or stream?
- What type of sample will be collected (i.e., water or lagoon liquids, or non-aqueous phase liquids [e.g. oils])?

There are two primary interferences or potential problems associated with surface water sampling. These include cross contamination and improper sample collection. Cross contamination problems can be eliminated, or at least minimized, through the use of dedicated sampling equipment. If this is not possible or practical, then decontamination of sampling equipment is necessary. Poor sampling quality can occur due to inadvertent substrate collection and sampling in an obviously disturbed area. Following proper decontamination procedures and minimizing disturbance of the sample site will help to eliminate these problems.

Safety and Environment

This section describes health, safety and environmental considerations for surface water sampling:

Health and Safety

Field Safety Instructions developed by the contractor for the sampling activities should be followed.

Hazards include, but are not limited to:

- Manual handling injury associated with lifting and moving sampling equipment and samples – to mitigate determine that all loads are an appropriate weight for lifting (<10 kg), use correct lifting posture by bending at the knees, position so that load is balanced and does not cause undue strain, wear sturdy boots and clothing, park field vehicle with equipment close to water body (if possible) to avoid multiple loading and unloading, do not over-pack samples into coolers.
- Injury associated with slips and trips – to mitigate keep a tidy workplace and step carefully around tubing, hosing and other equipment.
- Hit by moving vehicle while sampling – to mitigate sampling team shall wear high visibility clothing, set up traffic controls around sampling area, position site vehicle so that it provides a barrier from potential traffic.
- Sunburn –to mitigate wear suitable clothing (including hat, trousers, long sleeved shirt), apply sunscreen regularly.

- Exposure to water – to mitigate handle water with care minimizing splashing or spills, understand Safety Data Sheet (SDS) for particular parameters of interest, wear appropriate personal protective equipment (PPE) including gloves, waders, escalate PPE requirements if conditions change.
- Exposure to biological hazards (including snakes, ants, mosquitoes, bees, poisonous plants) – to mitigate access sampling points by minimizing exposure to vegetation, plan sampling events at suitable times where risk of biological hazard is reduced, wear appropriate clothing and PPE (long sleeves, long pants, tuck pant legs into socks), make vibrations to alert snakes to your presence. Use insect spray or other insect deterrents.
- Working on or around water courses will require additional PPE which includes (but not limited to) a Type II personal floatation device (PFD) and never working alone. PFDs should be utilized when sampling in deep waters and for all other instances where potential drowning danger exists.

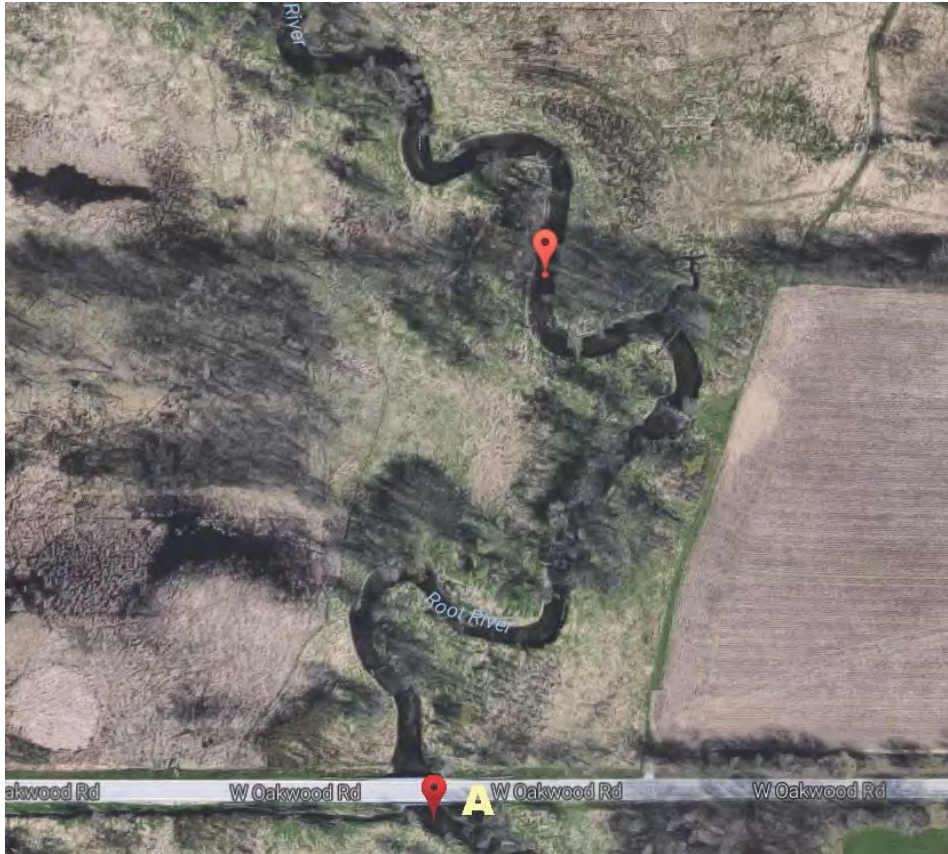
Environment

Sampling contractors will be exposed to environmental waters which may contain contaminants that are hazardous to human health. All personnel participating in field sampling shall be current on Occupational Safety and Health Administration (OSHA) medical screening and surveillance standards. These standards can be found on the OSHA organization web page:

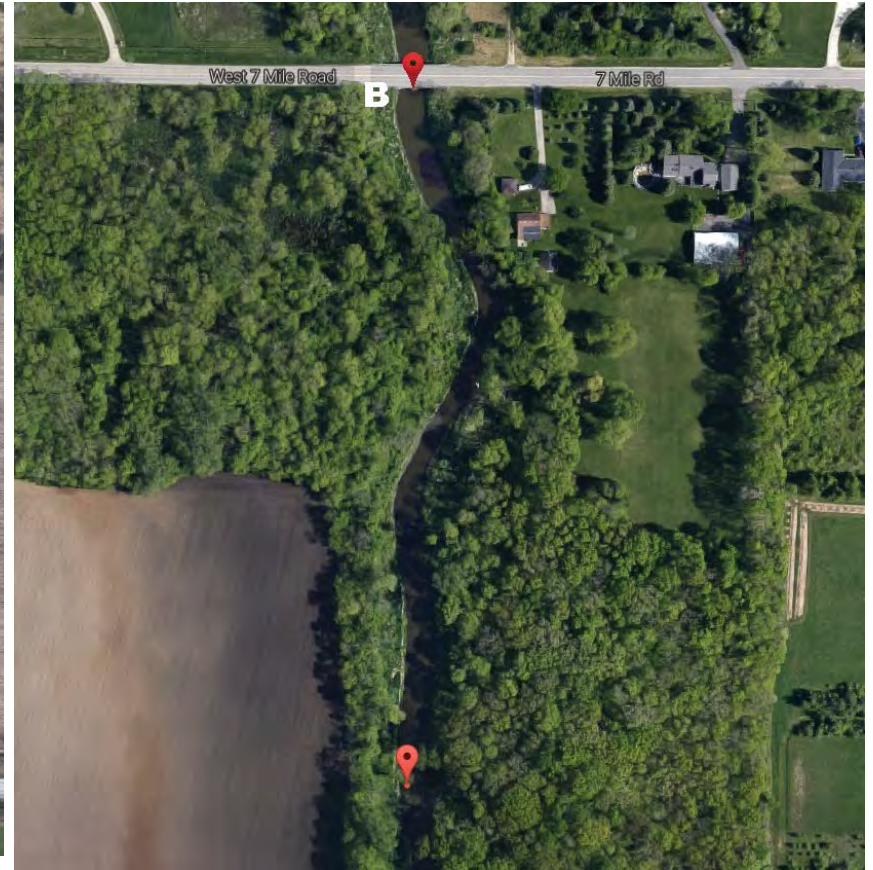
<https://www.osha.gov/SLTC/medicalsurveillance/standards.html>

Appendix III
Biological Data Collection Reach Maps

(A) Root River at Oakwood Road – Biological and habitat sampling reach shall be 35 times the stream width, or approximately 1,225 ft. reach.



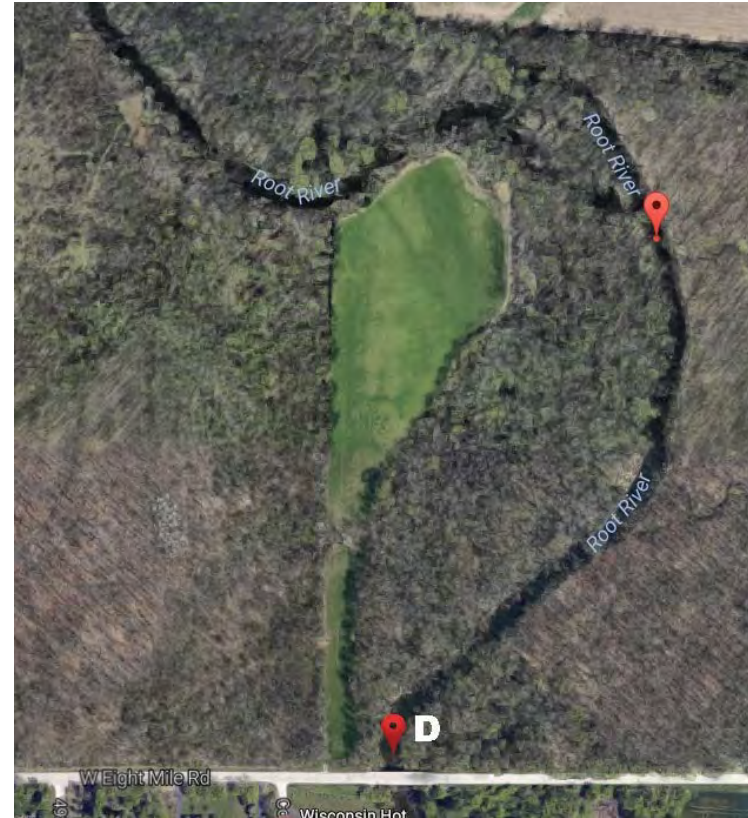
(B) Root River Canal at 7 Mile Road – Biological and habitat sampling reach shall be 35 times the stream width, or approximately 1,050 ft. reach.



(C) Root River on 60th Street bridge, at return flow outfall – Biological and habitat sampling reach shall be 35 times the stream width, or approximately 1,995 ft.



(D) Root River at County Line Road – Biological and habitat sampling reach shall be 35 times the stream width, or approximately 1,470 ft.



Appendix IV
Scientific Collectors Permit or
Research License

Scientific Collectors Permit or Research License Application and Authorization

Form 9400-379 (R 10/18)

Notice: Use of this form is required by the department to apply for a scientific collectors permit or research license pursuant to ss. 29.614 and 169.25, Wis. Stats. State Natural Areas require an additional separate permit for research and scientific collection purposes. The license/permit authority may cover migratory birds, nests and parts, but may not be exercised without an appropriate federal permit issued by the U.S. Fish and Wildlife Service. Personal information provided may be used to determine identity of the applicant, participation in natural resources surveys, eligibility for approvals and enforcement purposes. Information may be made available to requesters under Wisconsin's open records law, ss. 19.31 to 19.39, Wis. Stats. A social security number or federal employer identification number is REQUIRED when applying for licenses according to ss. 169.34 and 169.35, Wis. Stats., but the DNR may only disclose it to the Departments of Workforce Development and Revenue.

Mail or deliver this completed form to the appropriate department service center.

Check the one that applies:

- Scientific Collectors Permit** **Fee: \$0**
 (Used when collecting live fish, nests or the carcasses of wild animals for scientific purposes)
- Scientific Research License** **Fee: \$25.00**
 +\$20.00 late fee if application filed after license expiration date.
 (Used when taking and possessing live wild animals [other than fish] from the wild for research purposes.)

Include the required fees and copy of an Institutional Animal Care and Use protocol and approval (9 CFR 2.31) with application.

Applicant Information (please print or type)

Last Name		First	MI	Current License/ Permit No. (if renewal)			DNR Customer ID No.		
Agency or Organization				Daytime Telephone Number		Alternate Telephone Number			
Street or Route				<input type="checkbox"/> Social Security OR <input type="checkbox"/> Federal Employer Identification No.:					
City	State	ZIP Code	Date of Birth	Eye Color	Hair Color	Weight	Height	Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female	
Federal Permit No. (if any)		Date Federal Permit Expires		E-Mail Address					

Were you at any time during the past year convicted of any violation of the fish or game laws of Wisconsin?
 Yes No If Yes, Explain: _____

Explain Scientific Qualifications of Applicant – Required if applying for scientific research license

Collection Information

Species, Age or Size Class*, and Number of Specimens or Description of Items to be Collected or Possessed

* For game fish and pan fish species list young-of-year separately from larger length ranges

Purpose of Collecting or Possession

Method(s) of Collecting (for Chemical Immobilization, List Agents(s))

Location of Collecting or Possession Site(s) – County for all sites; waters for aquatic collections and civil township for all others

Collection or Possession Period Requested

**Scientific Collectors Permit or Research License
Application and Authorization**

Form 9400-379 (R 10/16)

Page 2 of 4

Collection Information (continued)		
Will State Natural Areas Be Used? <input type="checkbox"/> Yes <input type="checkbox"/> No	If Yes, List Area(s)	Natural Areas Permit Applied For? <input type="checkbox"/> Yes <input type="checkbox"/> No
Location Where Specimens or Items Will be Kept for Study (Be specific, including name or type of facility and street address.)		

Final Disposition of Specimens or Items Will be:

Agents – List names of all agents of the permittee/license holder that are authorized to act under the Scientific Collectors Permit or Scientific Research License

The permittee/licensee is responsible for actions of agents under the scientific collectors permit or research license. Each agent shall comply with all terms and conditions of the permit or license.

Agent Name	Date of Birth	Agent Name	Date of Birth

Certification

I certify that the information provided on this application is true and correct and that I will comply with the terms and conditions of this permit or license, including special restrictions. I understand that providing incorrect information may result in revocation of my permit or license and possible penalties.

Applicant Signature	Date Signed
If Applicant Less than 18 Years of Age, Signature of Parent or Guardian	Date Signed

Authorization – DNR Use Only

The license is subject to the following special restrictions and all conditions listed on the back of the license/permit.	License/Permit No.	
	Date Begins	Date Ends**
DNR Personnel Approval (Print Name)	Signature	Date Signed

** A scientific research license is valid from the date of issuance until the following December 31.
A scientific collectors permit expires on the date specified on the permit.

Scientific Collectors Permit or Research License Application and Authorization

Form 9400-379 (R 10/16)

Page 3 of 4

Section 29.614, Wis., Stats., Scientific Collector Permit

(1) Application for a scientific collector permit shall be submitted to the department. The department may issue a scientific collector permit if the department determines that the applicant is a natural person and is engaged in a bona fide program leading to increased, useful scientific knowledge.

(2) A scientific collector permit shall state the name and address of the permittee, the date of issuance, the purposes for which it is issued, the type, species and number of specimens authorized to be collected or salvaged, the area and period of time in which the specimens may be collected or salvaged, the place where the specimens may be kept and other conditions and limitations that the department requires. A scientific collector permit is not transferable.

(3) A scientific collector permit authorizes the permittee to collect or salvage from the wild, for scientific purposes only, live fish and the nests and carcasses of any wild animals specified in the permit subject to the conditions and limitations specified in the permit and rules of the department. The permittee may use the specimens for the scientific purposes for which collected or salvaged and may transport them or cause them to be transported by common carrier.

Possession of these specimens may not be transferred to any other person, except that these specimens may be exchanged for other specimens for scientific purposes. A scientific collector permit may authorize the use of net guns and tranquilizer guns for activities related to the purpose for which the permit is issued (not sure needed for live fish or dead animals-JAB). Any person who is convicted of violating this chapter shall forfeit the person's permit and the permit is thereby revoked, in addition to all other penalties. Any person so convicted is not eligible for a permit under this section for one year following the conviction.

Section 169.25, Wis., Stats., Scientific Research License

(1) Issuance. (a) The department shall issue a scientific research license to any person who is engaged in a study or in research that the department determines will lead to increased, useful scientific knowledge and who files a proper application and who pays the applicable fee.

(b) The department may also require the person to submit with the license application a copy of any of the following: 1. The person's study plan or research proposal. 2. An approval received by the person under 9 CFR 2.31.

(2) Authorization. A scientific research license authorizes the holder of the license to take from the wild, possess, kill, or propagate the species of native wild animals that the department authorizes under the license.

(3) Scope of license; contents. A scientific research license shall contain the holder's name and address, the date of issuance, and all of the following conditions or limitations: (a) The specific purposes for which it is issued.

(b) The species of wild animals and the number of each species to be studied.

(c) The locations from where the wild animals will be taken.

(d) The locations at which the wild animals will be kept and studied.

(e) The periods of time in which the wild animals may be studied.

(f) Any other conditions or limitations that the department considers reasonable.

(4) Equipment. A scientific research license may authorize the use of net guns, tranquilizer guns and other equipment or supplies for activities related to scientific research or study.

(5) Title to; transfer and disposal of wild animals. (a) A person holding a scientific research license may not transfer and wild animal or its carcass held under the authority of the license unless the purpose of the transfer is to trade the wild animals for other animals for scientific research or classroom demonstrations and the transfer is specifically authorized by the department at the time of the transfer.

(b) A person holding a scientific research license shall release or dispose of a live wild animal possessed under the authority of the license, or its carcass, only in the manner specifically authorized by the department.

(6) Rules. The department may promulgate rules to establish additional standards, limitations, and requirements for scientific research licenses.

Section 169.36, Wis., Stats., Record-keeping and reporting

(5) Scientific Research License. Each person holding a scientific research license shall keep a correct and complete record of all of the following information for each animal:

(a) The disposition of the wild animal, including the date and location of its release into the wild or its transfer to the department.

(b) The cause of death, if known, for a wild animal that dies.

NR 19.11 Scientific collectors permits and scientific research licenses

(1) DEFINITIONS. For the purposes of implementing ss. 29.614 and 169.25, Stats., and within this section, the following definitions apply:

(a) "Qualified natural person" or "person" means any individual complying with s. 29.614, Stats., and this section, not including a corporation, partnership, cooperative, society, association or other organization.

(b) "Bonafide research program" means planned study and investigation undertaken to discover or establish facts or principles leading to increased, useful scientific knowledge.

(c) "Useful scientific knowledge" means new information contributing to the long-term well-being of wild animals and their habitats, or providing educational opportunities in the natural sciences.

(2) APPLICABILITY.

(a) Permits not required. Scientific collectors permits are not required for the collection of wild plants, unprotected wild animals taken legally, or wild animals obtained from licensed game farms or fish hatcheries.

(b) Bird banding. Scientific collectors permits will be required for trapping and banding protected nonmigratory upland game birds.

(c) Licenses. A person is not required to possess a separate hunting, fishing or trapping license while collecting under a scientific collector permit.

(d) Endangered species. Endangered or threatened wild animals may be collected only under authority of endangered species permits issued by the department pursuant to s. 29.804, Stats., and ch. NR 27.

(e) Tagging of fish. Scientific collectors permits are required to capture a wild fish, attach a tag to any part of it, and then to release it back into waters of the state.

(3) PERMIT APPLICATIONS.

(a) Forms. Applications for scientific collectors permits shall be made on application forms provided by the department and include:

1. Name and address of the applicant;
2. Applicant's personal description;
3. Purpose of the request;
4. Species and number of specimens to be collected;
5. Places and times when specimens are to be collected;
6. Method of collecting;
7. Place where collections will be kept; and
8. Such additional information as may be requested by the department.
9. The period of the permit.

(b) Narrative proposal. All permit applications shall be accompanied by a written proposal stating the objectives, justifications, procedures, times and places of collection, application of results and sponsor, if any, of the project described in the application.

(4) PERMIT ISSUANCE.

(a) Issuance. Permits shall be issued in the name of the applicant. All agents of the permittee assisting in the permitted collections will be listed on the permit. Separate copies of permits shall be signed and carried by each person named in the permit when that person is acting under it in the absence of the permittee.

(b) Specimen materials. A permit will be issued for collections yielding preserved specimen materials only when such materials are to be kept in a place and manner where students and the public have access to them. Private collections to be kept in a manner not open to the public will not be approved.

Scientific Collectors Permit or Research License Application and Authorization

Form 9400-379 (R 10/16)

Page 4 of 4

(c) Conditions.

1. 'Contents.' Permits will contain conditions deemed necessary by the department to protect the resources of the state and assure use of specimens taken are in compliance with s. 29.614, Stats.
2. 'Nonresidents.' Permits issued to nonresidents will set forth conditions of removal of specimens from the state.
3. 'Federal permits.'
 - a. Permits involving the capture, marking, collection, possession or salvage of migratory birds or parts, nests or eggs of migratory birds will not be issued under this section until the applicant possesses a permit issued by the U.S. fish and wildlife service for that activity.
 - b. Permits under this section are not required for banding or marking capture-and-release activities authorized under a permit issued by the U.S. fish and wildlife service.
4. 'Size of collections.' Permits will not be issued which authorize collections endangering the population of animals the collection would draw from, or exceeding the number of animals required to meet the permittee's objectives.
5. 'Unprotected species.' Permits will not be issued for the collection of protected species if unprotected species can be used to accomplish the same purposes.

(5) PERMIT USAGE.

- (a) Disposition of specimens.
 1. Living unharmed specimens collected during the course of permitted activities shall be returned to the wild at the point of capture, unless otherwise provided in the permit.
 2. Any endangered or threatened species taken unintentionally during the course of permitted activities shall be immediately released if unharmed.
 3. Injured or dead wild animal specimens shall be immediately turned over to the department employee named in the permit unless otherwise provided in the permit.
- (b) Notification of department. Each permittee shall notify the department employee named in the permit at least 48 hours prior to collecting of the time and place where specimens will be collected.
- (c) Marked gear. All traps, nets and any other gear used for capturing wild animals under terms of a permit shall be marked with the permit number, name and address of the permittee.
- (d) Trap and net tending. All traps, nets and other capture emptied by the permittee at least once each 24-hour period.
- (e) Fishing gear restrictions.
 1. 'Gill nets.' Gill nets may not be used in inland waters unless specifically authorized by a permit.
 2. 'Buoys.' All buoys and buoy staffs shall be marked and maintained as required by the department. The permit number, name and address of the permittee shall be maintained in plain figures on the bowl of the buoy.
 3. 'Sport fishing equipment.' Hook and line fishing equipment and spearing equipment may not be possessed on a boat operating under a permit without prior approval of the department.

(6) RECORDKEEPING AND ANNUAL REPORTS.

- (a) Records. Each permittee shall keep current records, in the English language, of all collections under the permit. Records of collections shall be made available to the department during normal business hours, or upon 8 hours notice at other times.
- (b) Required reports. Permittees shall supply information requested by the department and annually file a complete and accurate report on forms covering activities conducted under authority of the permit. Unless otherwise provided in the permit, such reports shall be filed using a report form provided by the department not later than January 10 of the year following expiration of the permit.
- (c) Content. Annual reports by permittees shall include:
 1. The common name, scientific name and number of each species and type of specimen material collected;
 2. The date and geographic location of each collection;
 3. Disposition of collected specimens; and
 4. Any other information requested by the department.

(7) DISPOSITION. Specimens collected under the authority of the scientific collector permit may be transferred to and possessed by an educational institution for exhibition or education purposes upon completion of the project or expiration of the permit. Environmental consulting organizations may retain specimens following permit expiration provided the specimens are marked in a manner prescribed by the department. An educational institution or environmental consulting organization possessing specimens shall possess written proof of source, including the scientific collector permit number of the source and present that proof upon request by the department.

Please Note:

State Natural Areas and Threatened or Endangered Species

A separate permit is required for research and scientific collection involving state natural areas or for the collection or possession of threatened or endangered species.

An application can be obtained by writing to or calling:

Department of Natural Resources
Natural Heritage Conservation
Box 7921
Madison, WI 53707
Phone: (608) 261-6449

Federal permits for migratory birds may be obtained from the Special Agent in Charge, U.S. Fish and Wildlife Service, Federal Building, Fort Snelling, Twin Cities, MN 55111.

Notice of Appeal Rights

If you believe that you have a right to challenge this decision, you should know that Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions must be filed.

For judicial review of a decision pursuant to section 227.52 and 227.53, Wis. Stats., as renumbered by 1985 Wisconsin Act 182, you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

To request a contested case hearing pursuant to section 227.42, Wis. Stats., as renumbered by 1985 Wisconsin Act 182, you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the 30-day period for filing a petition for judicial review.

This notice is provided pursuant to section 227.48(2), Wis. Stats., as renumbered by the 1985 Wisconsin Act 182.