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January 25, 2023

Ms. Sarah Krueger, P.G.
Contaminated Sediment Specialist
Wisconsin Department of Natural Resources
2984 Shawano Avenue
Green Bay, WI 54313-6727

[sent electronically]

Subject: Response to WDNR Comments (November 28, 2022) Natural Recovery Monitoring Plan for
Fish Tissue Monitoring
HARP Long-Term Natural Recovery Monitoring
BRRTS #02-08-587669

Dear Ms. Krueger:

Thank you for the Department's comments and conditions on the above as contained in its letter dated November 28, 2022. On behalf of Tecumseh, attached are our responses and enclosed is the Natural Recovery Monitoring Plan for Fish Tissue Monitoring, January 2023, Revision 2. We have also enclosed the appropriate form.

If you have any questions, please contact me at (312) 909-0043 or via e-mail at charvey@trccompanies.com.

Sincerely,

TRC Environmental Corporation

A handwritten signature in black ink, appearing to read "CH" followed by a checkmark-like flourish.

Chris Harvey, P.E.
Vice President – Complex Projects

Attachments: Natural Recovery Monitoring Plan for Fish Tissue Monitoring – Revision 2

cc: William Nelson/WDNR – Madison, WI
S. Jason Smith/Tecumseh Products Co. – Paris, TN
Curtis Toll/Greenberg Traurig LLP – Philadelphia, PA
Marc Faecher/TRC – New Providence, NJ
John Rice/TRC – Madison, WI
David Crass/Michael Best & Friedrich LLP – Madison, WI

Notice: Use this form to request a **written response (on agency letterhead)** from the Department of Natural Resources (DNR) regarding technical assistance, a post-closure change to a site, a specialized agreement or liability clarification for Property with known or suspected environmental contamination. A fee will be required as is authorized by s. 292.55, Wis. Stats., and NR 749, Wis. Adm. Code., unless noted in the instructions below. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records law [ss. 19.31 - 19.39, Wis. Stats.].

Definitions

"Property" refers to the subject Property that is perceived to have been or has been impacted by the discharge of hazardous substances.

"Liability Clarification" refers to a written determination by the Department provided in response to a request made on this form. The response clarifies whether a person is or may become liable for the environmental contamination of a Property, as provided in s. 292.55, Wis. Stats.

"Technical Assistance" refers to the Department's assistance or comments on the planning and implementation of an environmental investigation or environmental cleanup on a Property in response to a request made on this form as provided in s. 292.55, Wis. Stats.

"Post-closure modification" refers to changes to Property boundaries and/or continuing obligations for Properties or sites that received closure letters for which continuing obligations have been applied or where contamination remains. Many, but not all, of these sites are included on the GIS Registry layer of RR Sites Map to provide public notice of residual contamination and continuing obligations.

Select the Correct Form

This form should be used to request the following from the DNR:

- Technical Assistance
- Liability Clarification
- Post-Closure Modifications
- Specialized Agreements (tax cancellation, negotiated agreements, etc.)

Do **not** use this form if one of the following applies:

- Request for an **off-site liability exemption or clarification** for Property that has been or is perceived to be contaminated by one or more hazardous substances that originated on another Property containing the source of the contamination. Use DNR's Off-Site Liability Exemption and Liability Clarification Application Form 4400-201.
- Submittal of an Environmental Assessment for the **Lender Liability Exemption**, s 292.21, Wis. Stats., **if no response or review by DNR is requested**. Use the Lender Liability Exemption Environmental Assessment Tracking Form 4400-196.
- Request for an **exemption to develop on a historic fill site** or licensed landfill. Use DNR's Form 4400-226 or 4400-226A.
- **Request for closure** for Property where the investigation and cleanup actions are completed. Use DNR's Case Closure - GIS Registry Form 4400-202.

All forms, publications and additional information are available on the internet at: dnr.wi.gov/topic/Brownfields/Pubs.html.

Instructions

1. Complete sections 1, 2, 6 and 7 for all requests. Be sure to provide adequate and complete information.
2. Select the type of assistance requested: Section 3 for technical assistance or post-closure modifications, Section 4 for a written determination or clarification of environmental liabilities; or Section 5 for a specialized agreement.
3. Include the fee payment that is listed in Section 3, 4, or 5, unless you are a "Voluntary Party" enrolled in the Voluntary Party Liability Exemption Program **and** the questions in Section 2 direct otherwise. Information on to whom and where to send the fee is found in Section 8 of this form.
4. Send the completed request, supporting materials and the fee to the appropriate DNR regional office where the Property is located. See the map on the last page of this form. A paper copy of the signed form and all reports and supporting materials shall be sent with an electronic copy of the form and supporting materials on a compact disk. For electronic document submittal requirements see: <http://dnr.wi.gov/files/PDF/pubs/rr/RR690.pdf>

The time required for DNR's determination varies depending on the complexity of the site, and the clarity and completeness of the request and supporting documentation.

Technical Assistance, Environmental Liability Clarification or Post-Closure Modification Request

Form 4400-237 (R 12/18)

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Section 1. Contact and Recipient Information

Requester Information

This is the person requesting technical assistance or a post-closure modification review, that his or her liability be clarified or a specialized agreement and is identified as the requester in Section 7. DNR will address its response letter to this person.

Last Name Smith	First Jason	MI	Organization/ Business Name Tecumseh Products Company LLC
Mailing Address 5683 Hines Drive		City Ann Arbor	State MI
		ZIP Code 48108	
Phone # (include area code) (731) 707-2889	Fax # (include area code) (734) 352-3745	Email jason.smith@tecumseh.com	

The requester listed above: (select all that apply)

- Is currently the owner
 Is considering selling the Property
 Is renting or leasing the Property
 Is considering acquiring the Property
 Is a lender with a mortgagee interest in the Property
 Other. Explain the status of the Property with respect to the applicant:

Responsible Party

Contact Information (to be contacted with questions about this request)

Select if same as requester

Contact Last Name Smith	First Jason	MI	Organization/ Business Name Tecumseh Products Company LLC
Mailing Address 5683 Hines Drive		City Ann Arbor	State MI
		ZIP Code 48108	
Phone # (include area code) (731) 707-2889	Fax # (include area code) (734) 352-3745	Email jason.smith@tecumseh.com	

Environmental Consultant (if applicable)

Contact Last Name Harvey	First Chris	MI	Organization/ Business Name TRC Environmental Corporation
Mailing Address 230 West Monroe St., Suite 1840		City Chicago	State IL
		ZIP Code 60606	
Phone # (include area code) (312) 800-5910	Fax # (include area code) (312) 578-0877	Email charvey@trccompanies.com	

Property Owner (if different from requester)

Contact Last Name NA	First	MI	Organization/ Business Name
Mailing Address		City	State
		ZIP Code	
Phone # (include area code)	Fax # (include area code)	Email	

Technical Assistance, Environmental Liability Clarification or Post-Closure Modification Request

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Section 2. Property Information

Property Name Downstream of Hayton Mill Pond Dam		FID No. (if known) WID006116529	
BRRTS No. (if known) 02-08-587108	Parcel Identification Number		
Street Address 3755 Weeks Road	City Chilton	State WI	ZIP Code 53014
County Calumet	Municipality where the Property is located <input type="radio"/> City <input checked="" type="radio"/> Town <input type="radio"/> Village of Charlestown	Property is composed of: <input type="radio"/> Single tax parcel <input checked="" type="radio"/> Multiple tax parcels	Property Size Acres 266

1. Is a response needed by a specific date? (e.g., Property closing date) Note: Most requests are completed within 60 days. Please plan accordingly.

No Yes

Date requested by: _____

Reason:

2. Is the "Requester" enrolled as a Voluntary Party in the Voluntary Party Liability Exemption (VPLE) program?

No. **Include the fee that is required for your request in Section 3, 4 or 5.**

Yes. **Do not include a separate fee.** This request will be billed separately through the VPLE Program.

Fill out the information in Section 3, 4 or 5 which corresponds with the type of request:

Section 3. Technical Assistance or Post-Closure Modifications;

Section 4. Liability Clarification; or Section 5. Specialized Agreement.

Section 3. Request for Technical Assistance or Post-Closure Modification

Select the type of technical assistance requested: [Numbers in brackets are for WI DNR Use]

- No Further Action Letter (NFA) (Immediate Actions) - NR 708.09, [183] - **Include a fee of \$350.** Use for a written response to an immediate action after a discharge of a hazardous substance occurs. Generally, these are for a one-time spill event.
- Review of Site Investigation Work Plan - NR 716.09, [135] - **Include a fee of \$700.**
- Review of Site Investigation Report - NR 716.15, [137] - **Include a fee of \$1050.**
- Approval of a Site-Specific Soil Cleanup Standard - NR 720.10 or 12, [67] - **Include a fee of \$1050.**
- Review of a Remedial Action Options Report - NR 722.13, [143] - **Include a fee of \$1050.**
- Review of a Remedial Action Design Report - NR 724.09, [148] - **Include a fee of \$1050.**
- Review of a Remedial Action Documentation Report - NR 724.15, [152] - **Include a fee of \$350**
- Review of a Long-term Monitoring Plan - NR 724.17, [25] - **Include a fee of \$425.**
- Review of an Operation and Maintenance Plan - NR 724.13, [192] - **Include a fee of \$425.**

Other Technical Assistance - s. 292.55, Wis. Stats. [97] (For request to build on an abandoned landfill use Form 4400-226)

- Schedule a Technical Assistance Meeting - **Include a fee of \$700.**
- Hazardous Waste Determination - **Include a fee of \$700.**
- Other Technical Assistance - **Include a fee of \$700.** Explain your request in an attachment.

Post-Closure Modifications - NR 727, [181]

- Post-Closure Modifications: Modification to Property boundaries and/or continuing obligations of a closed site or Property; sites may be on the GIS Registry. This also includes removal of a site or Property from the GIS Registry. **Include a fee of \$1050, and:**
 - Include a fee of \$300 for sites with residual soil contamination; and
 - Include a fee of \$350 for sites with residual groundwater contamination, monitoring wells or for vapor intrusion continuing obligations.

Attach a description of the changes you are proposing, and documentation as to why the changes are needed (if the change to a Property, site or continuing obligation will result in revised maps, maintenance plans or photographs, those documents may be submitted later in the approval process, on a case-by-case basis).

Technical Assistance, Environmental Liability Clarification or Post-Closure Modification Request

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Skip Sections 4 and 5 if the technical assistance you are requesting is listed above and complete Sections 6 and 7 of this form.

Section 5. Request for a Specialized Agreement

Select the type of agreement needed. Include the appropriate draft agreements and supporting materials. Complete Sections 6 and 7 of this form. More information and model draft agreements are available at: dnr.wi.gov/topic/Brownfields/lgu.html#tabx4.

- Tax cancellation agreement - s. 75.105(2)(d), Wis. Stats. [654]
❖ Include a fee of \$700, and the information listed below:
(1) Phase I and II Environmental Site Assessment Reports,
(2) a copy of the Property deed with the correct legal description.
- Agreement for assignment of tax foreclosure judgement - s.75.106, Wis. Stats. [666]
❖ Include a fee of \$700, and the information listed below:
(1) Phase I and II Environmental Site Assessment Reports,
(2) a copy of the Property deed with the correct legal description.
- Negotiated agreement - Enforceable contract for non-emergency remediation - s. 292.11(7)(d) and (e), Wis. Stats. [630]
❖ Include a fee of \$1400, and the information listed below:
(1) a draft schedule for remediation; and,
(2) the name, mailing address, phone and email for each party to the agreement.

Section 6. Other Information Submitted

Identify all materials that are included with this request.

Send both a paper copy of the signed form and all reports and supporting materials, and an electronic copy of the form and all reports, including Environmental Site Assessment Reports, and supporting materials on a compact disk.

Include one copy of any document from any state agency files that you want the Department to review as part of this request. The person submitting this request is responsible for contacting other state agencies to obtain appropriate reports or information.

- Phase I Environmental Site Assessment Report - Date: _____
- Phase II Environmental Site Assessment Report - Date: _____
- Legal Description of Property (required for all liability requests and specialized agreements)
- Map of the Property (required for all liability requests and specialized agreements)
- Analytical results of the following sampled media: Select all that apply and include date of collection.
- Groundwater Soil Sediment Other medium - Describe: _____
- Date of Collection: _____
- A copy of the closure letter and submittal materials
- Draft tax cancellation agreement
- Draft agreement for assignment of tax foreclosure judgment
- Other report(s) or information - Describe: Long-Term Natural Recovery Monitoring Plan - Fish Tissue

For Property with newly identified discharges of hazardous substances only: Has a notification of a discharge of a hazardous substance been sent to the DNR as required by s. NR 706.05(1)(b), Wis. Adm. Code?

- Yes - Date (if known): _____
- No

Note: The Notification for Hazardous Substance Discharge (non-emergency) form is available at: dnr.wi.gov/files/PDF/forms/4400/4400-225.pdf.

Section 7. Certification by the Person who completed this form

- I am the person submitting this request (requester)
- I prepared this request for: Tecumseh Products Company LLC
Requester Name

I certify that I am familiar with the information submitted on this request, and that the information on and included with this request is true, accurate and complete to the best of my knowledge. I also certify I have the legal authority and the applicant's permission to make this request.

**Technical Assistance, Environmental Liability
Clarification or Post-Closure Modification Request**

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1/25/2023

Signature

Date Signed

Vice President

(312) 909-0043

Title

Telephone Number (include area code)

Technical Assistance, Environmental Liability Clarification or Post-Closure Modification Request

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Section 8. DNR Contacts and Addresses for Request Submittals

Send or deliver one paper copy and one electronic copy on a compact disk of the completed request, supporting materials, and fee to the region where the property is located to the address below. Contact a **DNR regional brownfields specialist** with any questions about this form or a specific situation involving a contaminated property. For electronic document submittal requirements see: <http://dnr.wi.gov/files/PDF/pubs/rr/RR690.pdf>.

DNR NORTHERN REGION

Attn: RR Program Assistant
Department of Natural Resources
223 E Steinfest Rd Antigo, WI 54409

DNR NORTHEAST REGION

Attn: RR Program Assistant
Department of Natural Resources
2984 Shawano Avenue
Green Bay WI 54313

DNR SOUTH CENTRAL REGION

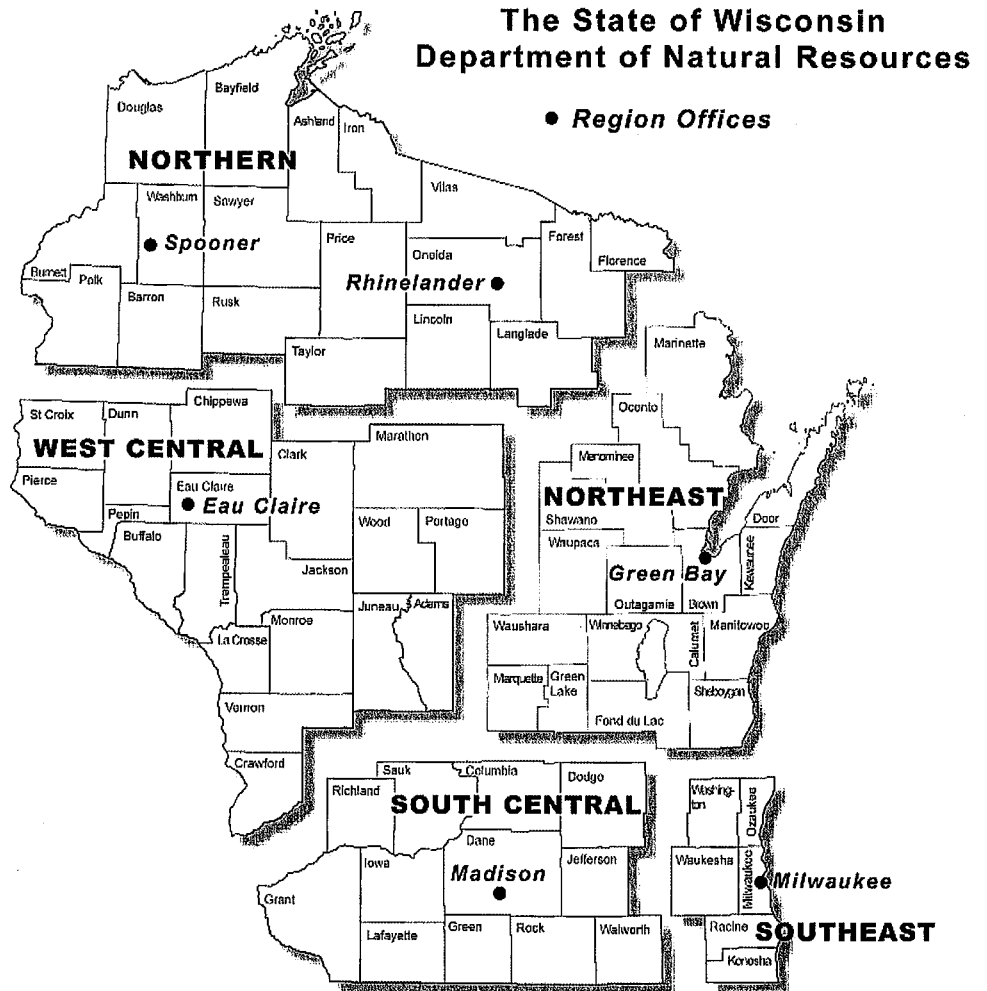
Attn: RR Program Assistant
Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg WI 53711

DNR SOUTHEAST REGION

Attn: RR Program Assistant
Department of Natural Resources
2300 North Martin Luther King Drive
Milwaukee WI 53212

DNR WEST CENTRAL REGION

Attn: RR Program Assistant
Department of Natural Resources
1300 Clairemont Ave.
Eau Claire WI 54702



Note: These are the Remediation and Redevelopment Program's designated regions. Other DNR program regional boundaries may be different.

DNR Use Only			
Date Received	Date Assigned	BRRTS Activity Code	BRRTS No. (if used)
DNR Reviewer		Comments	
Fee Enclosed? <input type="radio"/> Yes <input type="radio"/> No	Fee Amount \$	Date Additional Information Requested	Date Requested for DNR Response Letter
Date Approved	Final Determination		



Long-Term Natural Recovery Monitoring Plan for Fish Tissue Monitoring

Hayton Area Remediation Project Chilton, Wisconsin

January 2023
Revision 2

A handwritten signature in blue ink, appearing to read "CH".

Chris Harvey, P.E.
Vice President

BRRTS No. 02-08-587669

Prepared For:

Tecumseh Products Company LLC

Prepared By:

TRC Environmental Corporation
230 W. Monroe Street, Suite 1840
Chicago, IL 60606

A handwritten signature in blue ink, appearing to read "Robert W. Hanley".

Robert W. Hanley, Ph.D.
Senior Consultant



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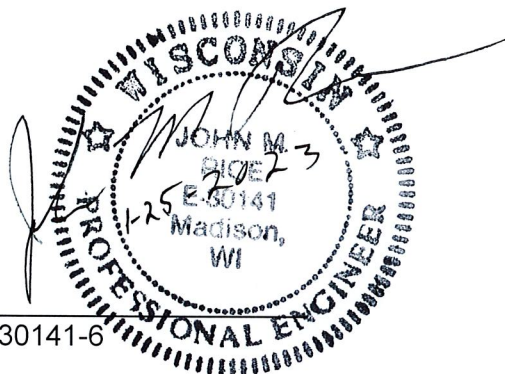
Figure 1: Site Location Map

Figure 2: Natural Monitoring Recovery Fish Tissue Collection Locations

1.0 Professional Certification

Consistent with NR 712.09(1) Wis. Adm. Code that submittals prepared by, or under the supervision of, a professional engineer, a hydrogeologist or a scientist shall be dated and certified by the professional engineer, hydrogeologist or scientist using the appropriate certification:

"I, John Rice, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR700 to 726, Wis. Adm. Code.



John Rice, P.E. No. 30141-6

(SEAL)

2.0 Project Management Plan

Consistent with NR 724.05(2)(e) Wis. Adm. Code, the following information is provided:

1. Site Address and Location:

- Street Address: 3755 Weeks Road, Chilton, Wisconsin 53014
- Quarter-Quarter Section, Township, Range, and County: SE ¼ of SW ¼ of Section 16, SW ¼ and SE ¼ and NE ¼ of SE ¼ of Section 16, SE ¼ of NE ¼ of Section 16, SW ¼ and SE ¼ of NW ¼ of Section 15 of Township 18 North, Range 20 East, Calumet County
- NR 716.15 (5) (d) Location Information: Refer to **Figure 1**
- Latitude and Longitude: 88°07'06.40"W, 44°01'29.00"N
- Wisconsin Transverse Mercator (WTM) Coordinates: 1,300,324.49342 U.S. ft. N, 2,200,751.36494 U.S. ft. E

2. Responsible Party:

- Tecumseh Products Company LLC
5683 Hines Drive
Ann Arbor, MI 48108

Mr. Stan Gilhool, General Counsel
(734) 585-9616 direct
Stan.gilhool@tecumseh.com

3. Name of the Consultant Involved with the Project:

- TRC Environmental Corporation
230 West Monroe Street, Suite 1840
Chicago, IL 60606

Mr. Chris Harvey, P.E.
charvey@trccompanies.com
(312) 909-0043 cell

3.0 Introduction

Consistent with NR 724.05(2)(e) Wis. Adm. Code, the following applicable information is provided.

3.1 Overview

The purpose of this Long-Term Natural Recovery Monitoring Plan (NRMP) for Fish Tissue Monitoring is to present the proposed approach to perform long-term natural recovery fish tissue monitoring consistent with and as required by Sec. III (L) and Exhibit G of the 2018 Negotiated Agreement (BRRTS #02-08-281506) (Negotiated Agreement). This NRMP is proposed to document the status of fish tissue following completion of the remedial activities in HARP. Over time, the concentrations of PCBs in fish tissue is expected to decline in response to the completed remedial actions.

3.2 Site History and Background

The area subject to this Monitoring Plan is located just north of New Holstein and east of Chilton, Wisconsin, and includes the Hayton Area Remediation Project (HARP) and areas downstream of the dam at the Hayton Millpond (WDNR, Tecumseh Products, and TRC, 2018)¹.

From 1956 to 2006, Tecumseh previously owned and operated a small engine manufacturing facility located at 1604 Michigan Avenue, New Holstein, Wisconsin (TRC, 2023). The property consists of approximately 39 acres (8 total parcels) that includes a developed section and an undeveloped lot. The former manufacturing building occupies approximately 404,700 square feet, and there are several outbuildings along the western portion of the property (TRC, 2023). Immediately north of the property is the storm water drainage ditch/outfall and agricultural fields. The storm sewer discharges to drainage ditches adjacent to the facility, which flow into Jordan Creek, Pine Creek, the Hayton Millpond, and the South Branch Manitowoc River (downstream of the dam).

HARP is divided into four Operable Units (OUs): OU1, OU2, OU3, and OU4. Figure 1 shows the extent of HARP and each OU. OU1 and OU2 Upper (OU2/Upper) extend from drainage ditches feeding into Jordan Creek northeast of New Holstein down to the intersection of Pine Creek and Danes Road. OU2/Lower and OU3 extend from Danes Road to Quarry Road. OU4/Upper is defined as Quarry Road to a point approximately 750 feet upstream from the farm bridge south of Calumet Street (U.S. Route 151) (see Figure 1). OU4/Lower includes the Millpond and the backwater effected area of Pine Creek that is created by the Hayton Dam. The south branch of the Manitowoc River enters the Millpond from the northwest, and Pine Creek enters from the south. The south branch of the Manitowoc River extends approximately 8.5 miles downstream of the Hayton Dam to its confluence with the North Branch Manitowoc River.

Significant risk reduction has been achieved by the remedial activities completed in HARP. The remediation activities resulted in significant polychlorinated biphenyl (PCB) source removal (greater than 96 percent mass removal) and restoration efforts have been completed in HARP OU1 through OU4/Lower between 2001 and 2020. The WDNR-approved remedial actions were completed by removing in-channel sediment and overbank soil in the dry. The excavated material

¹ Although this Monitoring Plan addressed both HARP and the area downstream of the millpond dam, pursuant to the Negotiated Agreement WDNR has assigned separate BRRTS numbers for HARP and the downstream area. Those BRRTS numbers are: 02-08-587669 and 02-08-587108.

was stabilized and disposed at a nearby landfill. More than 140,000 tons of sediment and soil were removed and disposed. All OUs have received No Further Action (“NFA”) letters. The remediation areas were successfully restored to approximately pre-existing conditions.

In November 2018, Wisconsin Department of Natural Resources (WDNR), Tecumseh, and TRC Environmental Corporation (TRC) executed a Negotiated Agreement (BRRTS #02-08-281506) (Negotiated Agreement), in which Tecumseh agreed to certain response actions and obligations (WDNR, Tecumseh Products, TRC, 2018). This NRMP was prepared in accordance with Sec. III (L) and Exhibit G of the Negotiated Agreement.

3.3 Purpose

As required by the Negotiated Agreement, Tecumseh will complete natural recovery monitoring of surface water, sediment, and fish tissue at the HARP Site, including areas downstream of the Hayton Millpond dam. The focus of this NRMP is to address the Wis. Adm. Code NR 724 requirements to submit a long-term monitoring plan to conduct the WDNR requested natural recovery monitoring for fish tissue by sampling fish tissue every three years. Surface water and sediment monitoring is addressed in a separate long-term monitoring plan as required by Sec. III (M) of the Negotiated Agreement.

The goal of the Long-Term NRMP for Fish Tissue Monitoring for the HARP is to present the approach to perform long-term natural recovery monitoring of the Site via fish tissue consistent with and as required by Sec. III(L) and Exhibit G of the 2018 Negotiated Agreement. The specific goals of the Long-Term NRMP for Fish Tissue Monitoring are to evaluate the change in fish tissue PCB concentrations and trends (within a reasonably anticipated timeframe of approximately 30 years) as an indicator of the overall effectiveness of the HARP remedial actions, evaluate the upper 95% confidence interval of the mean PCB concentrations in appropriate fish species sampled for human health in comparison to the WDNR Fish Consumption Response Action Goal and ecological risk, and to assess the need for further evaluation, analysis, or data collection. Sampling will be performed every three years.

The sampling and analysis discussed in Section 4 are being conducted to develop a compilation of data to address the NRMP goals as outlined above and justified by the current knowledge/data and the comprehensive remedial actions completed for HARP. Initially, this data collection will provide a baseline of data post-remediation. The results of the data collection will be evaluated following each sampling event by comparing concentrations at each individual sampling point and analyzing trends at each individual sampling point and across the whole system over time (three sampling events is necessary to establish a trend). Based on this evaluation, we will assess with the Department recommended next steps, if any, including the need for further evaluation, analysis, monitoring or data collection.

4.0 Sampling and Analysis Plan

Consistent with NR 724.17(2)(a) through (d) Wis. Adm. Code, this section provides information on the proposed fish tissue sampling and analysis strategy. Samples will be collected and analyzed in accordance with the Quality Assurance Project Plan (QAPP) developed for the project.

4.1 Scope of Work

Pursuant to the Negotiated Agreement, the fish sampling and monitoring program in this NRMP includes the following tasks:

- Collect fish tissue samples from locations as described in Exhibit G of the Negotiated Agreement and as depicted on Figure 2. These locations include one location within each HARP OU, two locations in the Manitowoc River downstream from OU4, and three upstream locations selected to provide “Background Data,” as described in Exhibit G.
 - **Optimum Completeness Goal** – The following number of fish samples will be targeted at each sampling location:
 - **Human health risk:** Twelve individual fish for both the primary (rock bass) and secondary (adult white sucker) human health indicator species. Individuals will be of edible size.
 - **Ecological risk:** Five individual fish for common carp and five composite samples of up to 15 fish each, *i.e.*, each sample will be comprised of up to 15 individual fish, for creek chub and juvenile white sucker. The smallest fish in each individual or composite sample from each location will be no less than 75% of the length of the largest individual. Samples of smaller fish, such as creek chub, will be of similar size and age class.
 - **Minimum Completeness Goal** – Reasonable efforts will be made to obtain the optimum numbers of target species. However, if sufficient numbers of fish cannot be collected at a sampling location, then the following actions will be taken: 1) alternate sizes of target fish, if available, will be used to fulfill the optimum number of individuals; 2) alternate species will be used *in lieu* of target species; and, 3) additional sampling activities will be considered. If these actions fail to yield the optimum goal, then the following minimum numbers of fish will be collected to satisfy project completeness goals (These minimum numbers will still provide a reasonable level of statistical power):
 - **Human health risk:** Eight individual fish for the primary, secondary and, to obtain data for two species, alternate human health indicator species may also be included. Individuals will be of edible size.

- **Ecological risk:** Five samples of three fish each for common carp, *i.e.*, each sample will be comprised of three fish each. Five composite samples of up to 10 fish each, *i.e.*, each sample will be comprised of up to ten fish each, for creek chub and juvenile white sucker. If required to meet the ecological risk objectives of data from three species, an alternate forage fish species, such as bluegill or common shiner, may be substituted. The smallest fish in each individual or composite sample from each location will be no less than 75% of the length of the largest individual. Samples of smaller fish, such as creek chub, will be of similar size and age class.
- Sample at least two species of game fish for human health monitoring. Rock bass (*Ambloplites rupestris*)² and adult white sucker (*Catostomus commersoni*) are the primary and secondary target species for human health monitoring, respectively. If rock bass or adult white sucker are not available in sufficient numbers at a sampling location, largemouth bass (*Micropterus salmoides*), small mouth bass (*Micropterus dolomieu*), pumpkinseed (*Lepomis gibbosus*) or black bullhead (*Ictalurus melas*) may be substituted as alternate human health risk species. Fish collected for human health risk will be of edible size based on WDNR fishing regulations.
- Sample at least three species of forage fish for ecological risk monitoring. The target species for ecological monitoring are common carp (*Cyprinus carpio*), creek chub (*Semotilus atromaculatus*), and juvenile white sucker. If the target forage fish species are not available in sufficient numbers at a sampling location, alternate forage species, such as bluegill (*Lepomis macrochirus*) blacknose dace (*Rhinichthys atratulus*) or common shiner (*Notropis cornutus*), may be substituted.
- Analyze for human health risk edible portions of fish (skin-on fillets with the belly flap) other than black bullhead, or skin-off fillets of black bullhead (a secondary human health risk species that may be substituted, should an insufficient number of the primary and/or secondary human health species not be available from a sampling location). Fish tissue will be analyzed for total PCBs, PCB Aroclors and lipids.
- Analyze whole forage fish as either individuals, *e.g.*, common carp, or composite samples of 15 smaller, similar-sized forage fish, *e.g.*, creek chub and juvenile white sucker, for ecological risk. Should an alternate forage fish species, such as bluegill or common shiner, be used, the decision to use individual fish or composited samples of smaller fish, will be based on size. Fish tissue will be analyzed for total PCBs, PCB Aroclors and lipids.
- Develop a data management system populated with “Baseline Data,” as defined in Exhibit G, and fish tissue monitoring data to allow comparison of fish tissue PCB concentrations over time with respect to baseline data.

Pursuant to ¶ III (H)(iv) and (L) of the Negotiated Agreement, fish tissue sampling will be conducted every three years until the “Fish Consumption Response Action Goal” is met.

² Species names are based on George C. Becker, 1983. *Fishes of Wisconsin*, University of Wisconsin Press, Madison, WI, USA.

4.2 Target Species

Target fish species and size ranges for OU1 through OU4 and the South Branch Manitowoc River downstream of the Hayton Dam are summarized on Table 4.1. Size classes in Table 4.1 are based on age classes reported in Becker, 1983. The primary and secondary target species to assess human health risk are rock bass and adult white sucker, respectively. If enough rock bass and/or white sucker cannot be collected at a sampling location, species, such as large-mouth bass, small-mouth bass, pumpkinseed, or black bullhead, may be substituted as alternate human health risk species. Size classes for fish sampled for human health risk are based either on WDNR fishing regulations or fish of edible size, where the regulations do not specify a minimum size.

Target species to assess ecological risk are common carp, creek chub and juvenile white sucker. If sufficient numbers of one or more of the target species cannot be collected at a sampling location, species such as bluegill, blacknose dace, or common shiner may be substituted as alternate ecological risk species. For ecological risk, the number of fish per composite is based on obtaining sufficient mass for PCB and lipid analysis. Fish included in each composite sample will be of similar length, such that the smallest fish in each composite will be no less than 75% of the length of the largest individual.

4.3 Sample Location Rationale

The HARP Fish Study Area has a variety of aquatic conditions ranging from small drainage ditches (OU1), small stream channels (OU2 and OU3), to wide backwaters from the Hayton Dam (OU4), to the relatively larger channel of the South Branch Manitowoc River downstream from Hayton Dam. Not all species are likely to be present in all habitat locations.

The sampling locations are depicted on Figure 2 and described in Table 4.2.

As allowed by the Negotiated Agreement and Exhibit G, Tecumseh proposes to collect “Background Data” from three fish sampling locations. Two of these locations, US1 and US2, are in the Manitowoc River. US1 is located at the Coffeen Road river access, and was selected as an upstream, riverine habitat similar to the two Manitowoc River downstream locations. At this location the South Branch Manitowoc River is a medium-sized stream, and the reach is upstream from the urbanized area of Chilton. US2 is in Chilton Millpond, an impoundment of the South Branch Manitowoc River. This location was selected as a background location comparable to Hayton Pond OU4. The third background location, US3, is located on Pine Creek at County Road T. This location was selected as a background location comparable to sampling locations in OU1, OU2 and OU3.

4.4 Sample Identification

The sample identification format for the NRMP has been designed to uniquely identify each sample from each sampling event. Samples will be assigned a unique alpha-numeric sample descriptor identifying the program, sample location, and media type. Each sample will be labeled as follows:

[program] – [location] – [risk category] - [species] - [date] – [number] – [rep]

4.4.1 Monitoring Program

All samples collected for natural recovery monitoring will be given the program designation of “NR”.

4.4.2 Sample Location

The sample location code will correspond to the sample locations indicated on Figure 2 as provided in Exhibit G of the Negotiated Agreement, and as follows:

- Operable Unit samples OU1, OU2, OU3 and OU4;
- Downstream Manitowoc River samples DS1 (near the Bonlander Farm) and DS2 (at Lemke Road);
- Upstream Manitowoc River samples US1 (at Coffeen Road) and US2 (Chilton Mill Pond); and
- Upstream Pine Creek sample US3 (at County Road T).

Sampling methods that will be used at each location are described in Section 4.5, below.

4.4.3 Risk Category

A two-letter code will designate the risk category associated with the species. HH will be used for fish collected for human health risk and EC will be used for fish collected for ecological risk.

4.4.4 Species

Each fish retained for PCB analysis will be assigned a species specific, three-letter code, as follows:

- **Primary and Secondary Human Health Target Species**
 - RKB – Rock bass;
 - WSA – White sucker – adult.
- **Alternate Human Health Species**
 - BBH – Black bullhead;
 - LMB – Large-mouth bass;
 - SMB – Small-mouth bass;
 - PMP – Pumpkinseed;
- **Ecological Target Species**
 - CCP – Common carp;
 - CKB – Creek chub;

- WSJ – White sucker – young-of-year.

- **Ecological Alternate Species**

- BND – Blacknose dace;
- BLU – Bluegill;
- CMS – Common shiner.

4.4.5 Date

The sample collection date (year, month, day) will be appended to each sample in the format “YYYYMMDD”.

4.4.6 Numbering

Where individual fish will be analyzed from a sample location, each individual fish of a species will be assigned a unique number, beginning with 01. Where composited fish will be analyzed (e.g., creek chub and adult and young-of-year white sucker), each composite will be identified as C#, where C# represents composite samples C1, C2, C3, etc.

4.4.7 Replicate Samples

After the fish collection inventory from a sampling event is available, fish will be paired to identify a primary and replicate individual or replicate composite. For species analyzed on an individual basis, a pair selected as primary and replicate will ideally be from the same haul and nearly identical in size (*i.e.*, within one inch of total length). For species analyzed as composite samples, a replicate composite will be prepared from a second group of fish in the same size class and ideally from the same haul. If the sample is retained as a field replicate, REP will be appended to the end of the sample identification.

4.5 Fish Sampling

At each fish sampling location, fish will be collected using seining, baited line, gill netting and electrofishing, with the method dependent on habitat characteristics, such as water depth, substrate, and channel configuration. For stream stations, sampling will occur both upstream and downstream of the sampling locations indicated on Figure 2. For lacustrine stations, daytime sampling will occur by boat traversing the lake along transects, or by placement of stationary devices for overnight sampling. For riverine stations, sampling will occur upstream and downstream either until the target completion objectives have been satisfied or ¼ mile from the sampling location centroid (Table 4.2 and Figure 2), whichever occurs first.

At the outset of a sampling effort, each station will be sampled for one day or until the target completeness goals have been achieved, whichever comes first. Fishing methods and locations will be based on the habitat at a sampling location and may be modified as necessary to adapt to field conditions and achieve the target completeness goals. If, after one day of sampling the minimum completeness goals have not been achieved, the sampling crew will move to a new sampling location.

The sampling crew will complete the circuit of all nine sampling locations in this manner, with a minimum of one day of sampling effort at each location. For any location where the target completeness goals have not been achieved, the following actions will be taken to optimize follow-up sampling efforts:

- **Resample incomplete stations:** Once all nine stations have been sampled, the sampling crew will return to any station and resample at that location for at least one more day. If after an additional day of sampling the minimum completeness goals for a sampling location have been achieved, sampling will be considered complete. If the minimum completeness goals have not been achieved and/or at WDNR's request, an additional round of sampling will be scheduled to take place approximately 30 days following the resampling event at any given location.
- **Reduce sample sizes:** If the requisite number of fish has not been achieved, and with WDNR approval, sample sizes will be reduced. Sampling will be considered complete if the minimum completeness goals have been achieved.
- **Use alternate species:** If the primary and secondary human health risk and/or ecological target species have not been collected, and with WDNR approval, alternate species will be used as surrogates. Selection of alternate species will be a decision made at the time of sampling based on availability of either an alternate human health risk species or ecological species.

In deeper water, two members of the sampling crew will operate the sampling equipment (i.e., boat and electrofishing equipment); a third sampling team member will use a dip net to capture fish. In shallow water, crew members will either electroshock using a backpack-electroshocking unit, or use a seine to capture fish. At all sampling locations, one team member will be the designated recorder and will make entries into a bound field notebook.

At each sampling point, specific locations will be selected at the time of sampling based on the field/water conditions on the day of sampling. Locations for fixed equipment will be recorded with a GPS and logged in the field notebook. The date, geographic coordinates (determined using a hand-held global positioning receiver), start and end times, water depth, starting point, ending point and turning points for each boat run will be recorded in bound field notebooks. For stream stations, time and location of each seine haul will be recorded. For sampling methods using fixed equipment, such as set lines or gill nets, the geographic coordinates, water depth, substrate, and deployment and recovery times will be recorded. There may be some sampling locations where no sample is collected due to the absence of fish meeting the criteria. Locations and time for fish caught by electrofishing, or hook and line will be recorded.

All fish captured at a sampling location will be placed in a wet well or bucket of water. Fish should be processed immediately upon completion of each station. For fish not retained for sampling, the maximum hold time will be one hour. For a live well with continuous water exchange, fish to be retained as a potential sample may be held until the end of a given sampling day, provided that the fish are monitored and are not excessively stressed (e.g., by remaining continuously in hot sun). Target species will be retained, and non-target species will be released.

Primary and secondary target fish species are listed in Section 4.2 and presented on Table 4.1. Rock bass and white sucker, the secondary human health indicator, do not have a WDNR specified minimum length limit. If collected, large-mouth bass, a proposed alternate human health

indicator, will be at or above the 14-inch WDNR legal limit. Retained rock bass, adult white sucker and large-mouth bass, or other alternate human health species, will be archived during field collection activities until the entire catch is evaluated and it can be determined that the completeness objectives for the primary species are fulfilled.

4.6 Fish Processing

4.6.1 Individual Fish

Fish retained for PCB and lipid analyses will be euthanized by cervical dislocation prior to shipping to the laboratory. For species analyzed on an individual basis, each retained fish will be tagged with a unique identification number (see Section 4.4), and the following data will be recorded:

- Unique individual sample identification,
- Collection time,
- Collection method,
- Standard length,
- Sex, if it can be determined from external morphological characteristics,
- Weight, and
- External abnormalities, such as tumors or lesions.

Individual fish will be tagged with the sample identification, wrapped in aluminum foil, and placed in a sealable clean plastic bag, with the bag labeled with the appropriate sample designation.

4.6.2 Compositing

For smaller fish, such as creek chub, juvenile white sucker, or alternate ecological risk species, a sample for tissue analysis will consist of a composite of five to 15 fish of approximately the same size, in which the targeted length of the smallest fish should be within 75% of the length of the largest individual (USEPA, 2000) and of sufficient mass to yield a minimum 50-gram sample required for PCB and lipid analyses. The number of fish in a composite will depend on size classes collected during a sampling event. The fish selected for each composite will be determined in the field at the end of a sampling event. To the extent possible, composites will be comprised of fish collected on the same day and approximate location. Each composite will be bagged and labeled in accordance with the sample identification scheme described in Section 4.4. Each composite sample will then be placed in a second bag, and that bag also labeled with the sample identification. For each fish in a composite sample, the following information will be recorded:

- Collection time,
- Collection method,
- Standard length,
- Sex, if it can be determined from external morphological characteristics,

- Weight, and
- External abnormalities, such as tumors or lesions.

4.6.3 Shipment

All bagged fish samples for PCB and lipid analysis will either be frozen in the field until the sampling event is complete, or, if shipped on the same day they are caught and selected for analysis, placed on ice in a plastic or metal cooler and shipped overnight to the laboratory for preparation and analysis. Frozen samples will be shipped on ice in plastic or metal coolers overnight to the laboratory.

4.6.4 Laboratory Handling

Fish tissue samples will be analyzed by an analytical laboratory that complies with NR 149, Laboratory Certification and Registration, for total PCB and total lipids in accordance with USEPA Office of Solid Waste and Emergency Response Directive 9200.1-77D.

In the laboratory, fish tissue will remain frozen until processing. Rock bass, adult white sucker, or large-mouth bass (or other edible-sized alternate human health species) collected for human health effects monitoring will be prepared as skin-on fillets (except for black bullhead) and analyzed on an individual basis, in accordance with the State Fish Consumption Advisory Program. Black bullhead, an alternate human health risk species, will be prepared as skin-off fillets. Fillets will be prepared by the contracted analytical laboratory to include flesh from the back of the head to the tail, and from the top of the back down to and including the belly flap. The left fillet of each species will be analyzed, and the right fillet will be archived. During processing in the laboratory, the sex of each fish will be recorded.

In the laboratory, fish processed for ecological monitoring will be processed either as individuals (e.g., carp) or as composites (e.g., juvenile white sucker). Individual fish or composites will be homogenized as whole fish. Prior to homogenization, the laboratory will be instructed to remove the identification tag, if present. After homogenization, equal aliquots of tissue will be drawn from each individual fish to prepare the composite sample. The remaining tissue will be archived, should it be determined that analysis of individual fish would be useful. For smaller fish retained as a composite sample (e.g., creek chub) after sufficient sample has been drawn for analysis, the remaining tissue will be archived.

The analytical methods, sample containers, and preservation requirements are summarized in the companion QAPP.

4.7 Quality Control (QC) Samples

This section summarizes the QC samples for this monitoring plan. More details of the QC samples and process is provided in the companion QAPP.

4.7.1 Field Replicate Samples

Field replicate samples of fish will be collected at a frequency of one per 20 (or fewer) samples per species, where an adequate number of fish species are present. For species where individual fish comprise a sample, *i.e.* (fish collected for human health) a pair of fish nearly identical in size

(i.e., the standard lengths of both fish are within one inch) collected from a sampling location and, if possible, from the same haul will be designated as the primary specimen and the replicate specimen. For species analyzed on a composited basis, a replicate composite sample will be prepared from a second group of fish of the same size class as the primary composite. Replicate composite groups may be prepared from multiple hauls but must be collected during the same sampling event as the primary sample.

4.7.2 Equipment Blanks

Equipment (rinsate) blanks are analyzed to check for contamination related to equipment decontamination procedures. Equipment blanks are collected by rinsing a piece of field-cleaned equipment with deionized water and collecting the rinsate in the sample container. In general, equipment blanks will only be collected if non-disposable, non-dedicated sampling equipment (e.g., seines, dip nets, fish boards, weighing scales, and unlined containers used to hold fish) is used. If applicable, equipment blanks will be collected for total PCBs at a frequency of one for every 20 (or fewer) primary samples that are collected with the non-dedicated, non-disposable equipment at each location.

4.7.3 Temperature Blanks

In accordance with NR 716.13 (6), the condition of each cooler will be evaluated upon receipt at the laboratory. Samples received on ice are considered preserved at the correct temperature (0-6°C). Temperature blanks may also be analyzed to assess whether the sample temperature was maintained during sample transport, especially in the case that the ice has all melted. Temperature blanks consist of a sample container, generally polyethylene, filled with tap water. One temperature blank will be transported with each cooler containing sample containers. Upon opening a cooler, the temperature of the temperature blank will be measured either directly by inserting a thermometer into the liquid portion of the blank or remotely by using a calibrated, infrared thermometer. If a cooler is shipped without a temperature blank, then the temperature of each sample will be measured remotely using a calibrated, infrared thermometer.

4.8 Decontamination

To the extent practicable, single-use sampling equipment and materials will be used for the collection of samples. The materials used will be new and clean, and will be placed in plastic for transport to the site. Once used, single-use equipment will be placed in plastic bags and managed as investigation derived waste (IDW) material. Single-use equipment may include, but is not limited to, the following:

- Disposable nitrile or latex gloves
- Aluminum foil applied to fish boards
- Plastic bags used to line wet wells or ice chests during sampling

Non-dedicated equipment used for sample collection or sample processing will be new or cleaned before its initial use in the field, and cleaned again before use at each subsequent sampling site (and between sample intervals). Equipment subject to this decontamination procedure includes, but is not limited to, the following:

- Seines and gill nets
- Scales for weighing fish
- Fish boards
- Unlined wet wells or coolers used to hold fish during a sampling event

The general procedure for decontaminating field equipment is as follows:

- Scrape off as much loose material as possible.
- Disassemble the equipment, as appropriate.
- Wash with detergent/potable water solution.
- Rinse thoroughly with distilled or deionized (DI) water.
- Allow equipment to air dry prior to next use.
- Wrap equipment for transport with inert material (aluminum foil or plastic wrap) to prevent direct contact with potentially contaminated material.

Field decontamination of sampling equipment will take place at a designated location on-site. Decontamination will be performed in 5-gallon buckets or small plastic wading pools, and managed as IDW (Section 4.9). Decontamination water will be changed out for new, clean solutions at a minimum of once per sampling day.

4.9 Investigation Derived Waste

IDW streams generated during this investigation are expected to include single use materials, such as those described in Section 4.8, above, decontamination fluids, and general refuse (e.g., used personal protective equipment, trash).

Decontamination fluids will be containerized in 55-gallon drums and stored at the fish processing area during the sampling event. The contents of the drums will be categorized in accordance with US Department of Transportation guidelines and labeled. At the end of the event, drums will be left on site for future characterization and disposal.

Used personal protective equipment and other types of general uncontaminated debris or waste materials produced during the fieldwork will be collected daily in sealed plastic bags, and placed in a waste dumpster. The waste materials will be disposed by a local commercial disposal contractor at the end of the fieldwork.

4.10 Permits

TRC will obtain appropriate scientific collection permits for fish tissue sampling prior to conducting each 3-year sampling event.

4.11 Coordination with WDNR

TRC will notify the Department a minimum of two weeks prior to conducting the fish sampling such that Department staff may accompany the field team, if desired.

5.0 Data Evaluation

This section provides information on the NRMP fish sampling data evaluation.

5.1 Data Evaluation

Remedy effectiveness will be evaluated by comparing monitored fish tissue data to “Baseline Data” and by comparing results for human health indicator species to the applicable fish consumption advisory concentration. TRC will evaluate the change in fish tissue concentrations and trends as one indicator of the overall effectiveness of the sediment removal remedy. Baseline data will consist of fish tissue PCB data collected by the WDNR from the Site prior to the effective date of the Negotiated Agreement. TRC will obtain WDNR fish tissue data and enter it into a data management system. Baseline data will be analyzed statistically for distribution, inter-species differences, and fish size and age trends. Best fit regression analysis will be used to develop length: PCB relationships for species included in the WDNR baseline data and will be conducted in accordance with Appendix V in the Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory (Great Lakes Sport Fish Advisory Task Force, 1993).

5.1.1 Descriptive Statistics

For each round of long-term fish tissue monitoring, descriptive statistics will be calculated for each sampling location and each fish species. Total PCB concentrations will be summed based on Aroclors detected, using zero for Aroclors not detected at the method detection limit (MDL). Estimated values, if reported, will be included in the sum. If no Aroclors are detected, the total PCBs will be equivalent to the highest MDL of all Aroclors.

Descriptive statistics will include mean, median, minimum and maximum, 10th, 25th, 50th, 75th, and 90th percentiles, percent non-detects, standard deviation and coefficient of variation (CV). These statistics will be used to verify the assumptions underlying the sampling design and to confirm that the expected level of statistical power is being achieved. These statistics will also be used to evaluate the achievement of human health and ecological target tissue goals, and background criteria.

5.1.2 Statistical Distribution Tests

Fish data will be subjected to statistical distribution tests to assess conformance with standard normal or lognormal distributions. Conformance with these distributions will confirm that use of parametric testing procedures, which are generally more powerful than non-parametric procedures, are appropriate for these data sets. Distribution testing will utilize either numerical procedures (e.g., Shapiro-Wilk or D’Agostino Tests) or graphical procedures (e.g., normal probability plots).

The 95 percent Upper Confidence Level (UCL) will be determined for human health fish tissue data from each station using the USEPA’s ProUCL (v 5.1 or greater) statistical program and compared to the Uniform Great Lakes Sport Fish Consumption Advisory (Great Lakes Sport Fish Advisory Task Force, 1993) recommendations of 0.22 milligrams PCB per kilogram fish tissue (mg/kg, or ppm) for consumption up to one meal per week of bluegill, crappies, yellow perch, sunfish, bullheads and inland trout, or 0.95 mg/kg PCB for consumption of up to one meal per month for walleye, pike, bass (including rock bass), catfish and all other species, as per *Choose*

wisely – 2016, a healthy guide for eating fish in Wisconsin, WDNR Publication PUB-FH-824 2016, which are the targeted Fish Consumption Action goals.

PCB data from the three background locations will be compared to both the Baseline Data and fish tissue data from OU1 through OU4. Background data will be used as an additional line of study to evaluate natural recovery of the Site.

5.1.3 Time Trend Analysis

A primary objective of the Long-Term NRMP for Fish Tissue is to demonstrate remedy effectiveness as measured by declining fish tissue PCB concentrations. Data will be analyzed using the following methods.

5.1.3.1 Comparison of Means

A simple test of significance is to compare the mean PCB concentrations between two monitoring events to determine if the mean value of the later event is significantly lower than the mean value of the preceding event. If the hypothesis is true, *i.e.*, that the mean PCB concentration in a given population is lower in the latter sampling event, the strength of this test should increase as the time between monitoring events increases. This type of analysis will allow calculation of an estimated percent reduction and statistical significance of PCB concentration reductions between WDNR baseline monitoring data and each successive three-year monitoring event. The specific statistical routine will be determined based on data distributions but will likely be a non-parametric method. US EPA's Pro-UCL version 5.2 statistical software will be used to evaluate data distributions and determine an appropriate statistical test for comparison of means.

5.1.3.2 Simple Linear Regression

Long-term trends will be evaluated by linear regression analysis. It is assumed that PCB concentration reductions will follow an exponential decay model, as has been the case in the Fox River (Anchor QEA, LLC, *et al.*, 2009). This model can be tested by fitting a linear Data Validation and Data Analysis regression through a plot of log PCB concentrations (in water, tissue, or sediment) versus time. Three post-remediation monitoring events will be conducted at Years 0, 3, and 6 to demonstrate remedy effectiveness and estimate the time rate of recovery. If the data are sufficient to estimate a model of PCB concentrations over time, the model can be used to predict future concentrations and compare predictions to risk reduction goals and other exit criteria. Time regressions will be performed separately for each OU and each fish species. For fish data, it may be appropriate to either stratify the data by size classes or normalize the data using lipid content or fish length, to reduce the effects of confounding variables.

Lipid normalization can be used to address variability associated with changes in lipid content and to facilitate comparisons across sampling times, locations, and species. This approach is only useful when a direct and proportional relationship can be observed between lipid content and PCB concentrations. Lipid normalized values will be derived by dividing total PCB (TPCB) by the fraction of lipid (Frac lipid) in the fish sample, as given by the following formula:

$$TPCB \left(\frac{mg \text{ PCB}}{kg \text{ lipid}} \right) = \frac{TPCB \left(\frac{mg \text{ PCB}}{kg \text{ tissue}} \right)}{Frac \text{ lipid} \left(\frac{kg \text{ lipid}}{kg \text{ tissue}} \right)}$$

A change over time of lipid-normalized total PCB concentrations provides an estimate of the decay rate of PCB concentrations in fish attributed to PCB exposure rather than to changes in lipid concentration.

Nonparametric trend analysis may be considered if the data are poorly described by standard statistical distributions.

The goal is for fish tissue PCB concentrations to be such that children under 15 years old and women of child-bearing age may safely consume one serving per week of bluegill, crappies, yellow perch, sunfish, bullheads and inland trout, and one serving per month of walleye, pike, bass, catfish and all other species. The targeted fish tissue PCB levels are not to exceed 0.22 mg/kg PCB for consumption up to one meal per week of bluegill, crappies, yellow perch, sunfish, bullheads, rock bass and inland trout, and not to exceed 0.95 mg/kg PCB for consumption of up to one meal per month of walleye, pike, large mouth and small mouth bass, catfish (other than bullhead) and all other species, in accordance with the Negotiated Agreement, WDNR Publication PUB-FH-824 2016 and WDNR's November 28, 2022, letter of conditional approval of this plan.

As per criterion 21 of Exhibit G to the Negotiated Agreement, sediment sampling consistent with Section III(M) of the Negotiated Agreement and the Site Investigation Work Plan Additional Investigation Sampling Plan, once approved by WDNR, will be performed concurrent with fish collection.

5.2 Fish Sample Results, Data Management, and Data Review

Laboratory data generated under the sampling described in this Long-Term NRMP for Fish Tissue will be subject to Level II data reporting, which includes the following:

- Cover letter
- Analytical results
- Analytical QC results (e.g., surrogate recoveries, method blanks, laboratory control samples, matrix spikes/matrix spike duplicates, as appropriate)
- Summary of nonconformances
- Laboratory copies of the Chain-of-Custody forms

Data review may be undertaken by one or more of the entities participating in this sampling program. Review of analytical data includes checks for data consistency by looking for comparability of duplicate analyses, potential sample contamination as indicated by the results of field blank or laboratory blank sample analyses, adherence to accuracy and precision acceptance criteria, transmittal errors, and anomalously high or low concentrations. Prior to importing the laboratory data into the database, TRC will review the analytical data reports for usability. Information on the usability assessment is provided in the QAPP developed for the project. If data completeness or usability is uncertain, TRC will attempt to resolve conflicts with the laboratory and obtain a revised analytical report. TRC will maintain the analytical data in a project database.

Data entered into the data management system will be reviewed for data entry errors.

6.0 Schedule and Reporting

Consistent with NR 724.17(3m) Wis. Adm. Code, this section provides information on the proposed schedule and reporting.

6.1 Schedule

According to the Negotiated Agreement, “beginning the year following completion of the OU4 Lower SOW and receipt of the Department’s no further action letters specified in this Agreement, Tecumseh shall perform or cause to be performed fish tissue monitoring on an every-three-year basis until the Wis. Admin. Code Ch. NR 726 and the Fish Consumption Response Action Goal is met for the Site.” In accordance with the ¶ III(H)(iv) of the Negotiated Agreement, fish tissue monitoring will be completed on a triennial basis.

Tecumseh proposes to complete the fish sampling in the same mobilization as surface water and sediment to better correlate and evaluate data and data trends. Fish tissue sampling will take place between July 1 and September 30, preferably in August or September when fish lipid content is typically high. Sampling times will be selected during periods representative of normal flow conditions. Due to the lack of stream flow gaging stations on the South Branch Manitowoc River, normal flow will be based on rainfall measured by the National Weather Service (NWS) at its Chilton, WI monitoring station, NWS Station USC00471568 during the seven-day interval preceding a scheduled sampling event.

Pending WDNR approval of this NRMP, the monitoring activities are scheduled to start in 2023 in conjunction with the natural recovery surface water and sediment sampling.

6.2 Reporting

In accordance with § NR 724.17(2)(3m), Wis. Admin. Code, sample results will be reported to the WDNR within 10 business days of receiving the sample results.

As noted in Sec. III(L) of the Negotiated Agreement, a monitoring report is required to be submitted by October 1 after each fish tissue sampling event. However, per discussions with WDNR on July 11, 2022, with WDNR approval, the monitoring report will be submitted within six months of completing the fish tissue monitoring and receipt of laboratory analytical results. The first and second monitoring reports will be submitted as an interim technical memorandum. The report will document the long-term monitoring activities conducted and will describe the methods employed during the sampling. The report will include a base map that shows the sampling locations. The analytical and physical results will be presented on figures and tables. The logs for fish sampling activities, as well as laboratory analytical reports, will be appended to the report. In addition, other appropriate data collected during the long-term monitoring will be appended to document the quality of work performed.

After the third sampling event, a final report will be prepared and submitted, including the data collected and providing a summary and evaluation of trends and recovery predictions. The fish tissue monitoring data will be evaluated in conjunction with the natural recovery surface water and sediment sampling results to monitor the long-term reduction in PCB concentrations and improvement in the HARP natural recovery according to the criteria outlined in Exhibit G of the Negotiated Agreement. The results from the young of the year sampling and analysis, if applicable and available, will be reviewed as a potential indicator of ecosystem recovery. Human

health goals will be based on the Fish Tissue Response Action goals as outlined in Section III (H)(iv) and Exhibit G of the Negotiated Agreement. These are matrix-specific screening levels that end-users of data can utilize to assess overall site status and determine if further evaluation or data collection is warranted. Trends in the data and projected recovery periods will be evaluated. The data will also be used to evaluate if and where additional investigations or remedial actions may be necessary if trends are not decreasing.

The trend in the data will be evaluated by fitting the data using the least squares method. Different trend line methods (e.g., linear, log, and/or exponential) will be evaluated to determine the best fit for illustrating the trend in fish tissue concentrations, as described in section 5.1.3. The upper 95% confidence interval of the mean PCB concentrations for human health will be calculated and compared to the Fish Consumption Response Action Goals as provided in Sec. III(L) of the Negotiated Agreement, baseline data and background data. The upper 95% confidence interval of the mean PCB concentrations for ecological risk monitoring will be calculated and compared to the baseline data and background data. Using Sen's slope estimate (other statistical methods may also be applied as dictated by the number of data points), increasing or decreasing trends (rate and magnitude) will be evaluated, using maximum and mean concentrations, across each location, each OU and for the entire site. If concentrations of total mean PCBs in fish tissue are decreasing over time with a significance level of 0.95, this will indicate a positive effect from the prior remedial action performed. A declining trend is defined as when the most recent concentration is lower than the baseline data (existing fish tissue data that the WDNR has collected prior to the Negotiated Agreement), with a negative slope with a significance level of 0.95 (or $p < 0.05$). If concentrations of total PCBs in fish tissue do not show a declining trend or show an ascending trend over time, this could require evaluation of additional data collection and/or sampling locations.

With respect to project screening criteria identified in the associated QAPP, these screening criteria are based on Table 3 in Wisconsin's Fish Contaminant Monitoring and Advisory Program:1970-2010, Candy S. Schrank, Wisconsin Department of Natural Resources, Wisconsin's Fish Contaminant Monitoring Program, DNR Administrative Report No. 73.

7.0 Technical Review Request

Pursuant to NR 749.02, Wis. Adm. Code, Tecumseh requests a technical review response from WDNR of this NRMP. TRC will provide a \$425 review fee.

8.0 References

- Anchor QEA, LLC; Tetra Tech EC, Inc.; Shaw Environmental & Infrastructure, Inc.; and LimnoTech, Inc. 2009. Long-term Monitoring Plan. Appendix I to Lower Fox River Remedial Design 100 Percent Report.
- Becker, George C. 1983. Fishes of Wisconsin. University of Wisconsin Press, Madison, WI, USA.
- Great Lakes Sport Fish Advisory Task Force. 1993. Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory. Protocol Drafting Committee.
- TRC. 2023. Site Investigation Work Plan. Additional Investigation Sampling Plan, Downstream Hayton Millpond Dam, Chilton, Wisconsin. January 2023.
- U.S. Environmental Protection Agency, 2000. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Fish Sampling and Analysis. Third Edition. EPA 823-B-00-007. US EPA Office of Water, Washington DC, USA.
- WDNR, Tecumseh Products, and TRC. 2018. Negotiated Agreement; BRRTS #02-08-281506.

**Table 4.1: Target Species, Size Classes and Compositing Plan
Hayton Area Remediation Project**

Species	Objective	2 - 4"	4 - 6"	6 - 8"	8 - 10"	10 - 12"	12 - 14"	14 - 16"	16 - 18"	18 - 20"	20 - 22"	22 - 24"	Skin on Fillet	Whole Fish	No. Individuals (target)	No. Individuals (minimum)	No. Composites
Rock Bass	Primary Human Health				Target	Alternate	Target	Target	Target				X	X	12	8	0
Large-mouth Bass, Small-mouth Bass, Pumpkinseed, Black Bullhead	Alternate Human Health				Alternate	Target	Target	Target	Target				X*	X	12	8	0
Adult White Sucker	Secondary Human Health			Target	Target	Target	Target	Target					X	X	12	8	0
Common Carp	Ecological				Alternate	Target	Target	Target	Target	Target	Target	Target		X	5	3	5
Creek Chub	Ecological	Target	Target	Target											15	10	5
Juvenile White Sucker	Ecological	Target	Target												15	10	5
Bluegill	Alternate Ecological	Target	Target												15	10	5
Blacknose Dace, Common Shinerl	Alternate Ecological	Target	Target												15	10	5

Notes:



Target size class

Alternate size class

NA

Not applicable, rock bass, largemouth bass, and adult white sucker will not be composited.

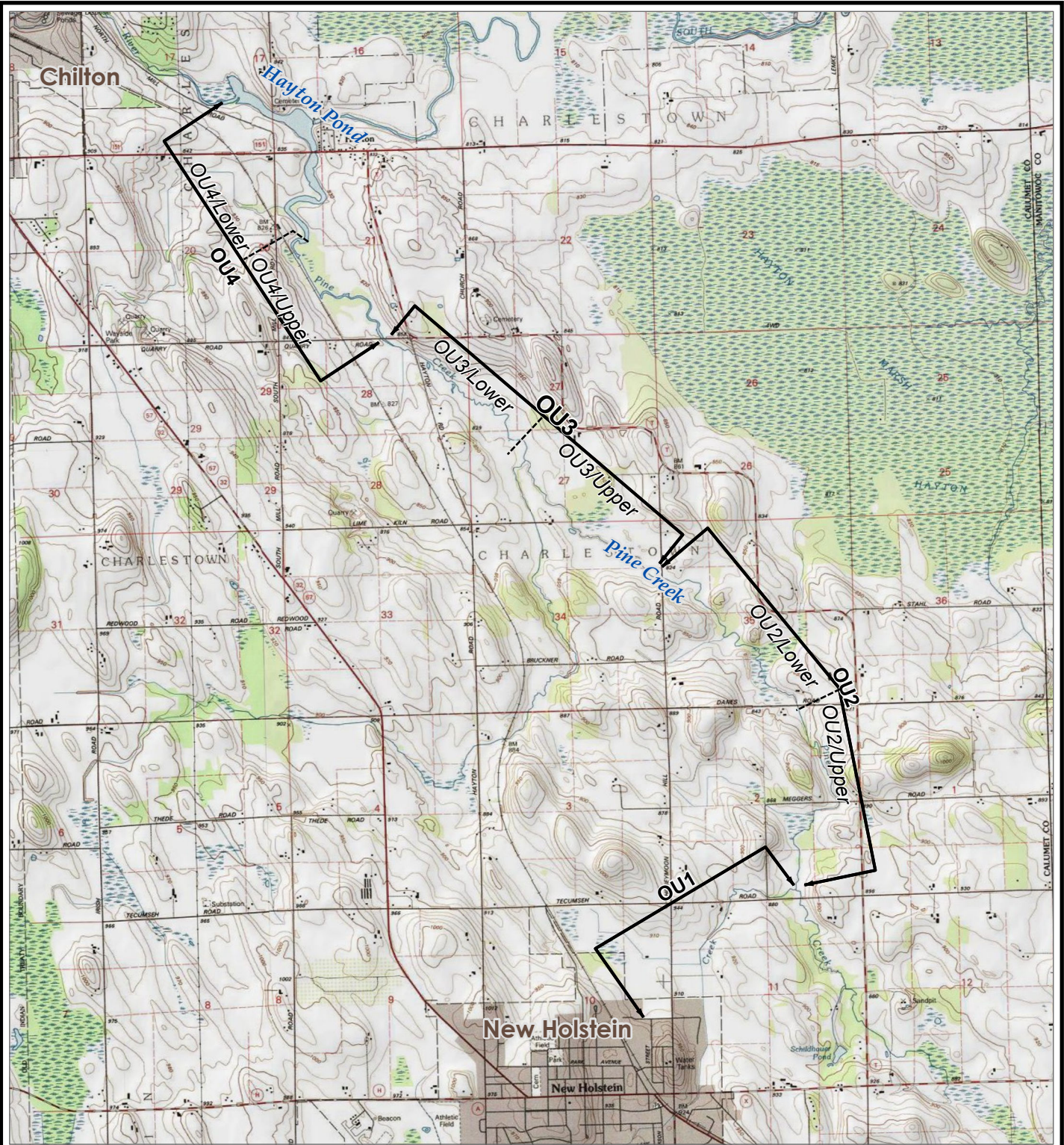
*

Black Bullhead will be skin-off fillets

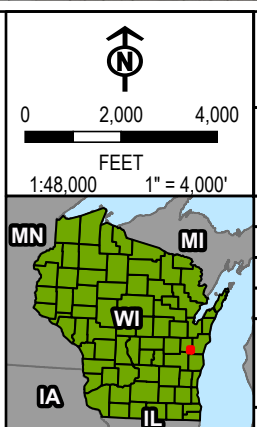
**Table 4.2: Fish Sampling Locations
Hayton Area Remediation Project**


Location	Location ID	N Lat.	W Long.	Purpose
Jordan Creek upstream from Tecumseh Road	OU1	43.959600°	88.079342°	OU1, downstream from alleged PCB source and wastewater treatment plant, small drainage ditch, riverine habitat.
Pine Creek at Danes Road	OU2	43.978585°	88.068268°	OU2, small stream, riverine habitat.
Pine Creek at Hayton Road	OU3	44.003889°	88.103132°	OU3, small stream riverine habitat.
Hayton Pond	OU4	44.023290°	88.118714°	OU4, Manitowoc River impoundment, open water lacustrine habitat.
Manitowoc River at Bonlander Farm	DS1	44.023688°	88.105730°	Large river, riverine habitat downstream from Hayton Pond.
Manitowoc River at Lemke Road	DS2	44.033707°	88.063022°	Large river, riverine habitat downstream from Hayton Pond.
Manitowoc River at Coffeen Road	US1	44.000166°	88.178529°	Background Location, riverine habitat, upstream from Chilton.
Manitowoc River at Hobart Park, Chilton Millpond	US2	44.023339°	88.169550°	Background Location, impounded open water habitat.
Pine Creek at County Road T bridge	US3	43.954506°	88.062010°	Background Location, upstream from Jordan Creek, small stream, riverine habitat.

COORDINATE SYSTEM: NAD 1983 STATEPLANE WISCONSIN SOUTH FIPS 4803 FEET, MAP ROTATION: 0
 - SAVED BY: BLEE ON 1/9/2023, 10:52:27 AM - FILE PATH: S:\PROJECTS\TECUMSEH\HARP\PRX\TECUMSEH\TECUMSEH.APRX LAYOUT NAME: FIG1 USGS 20210819

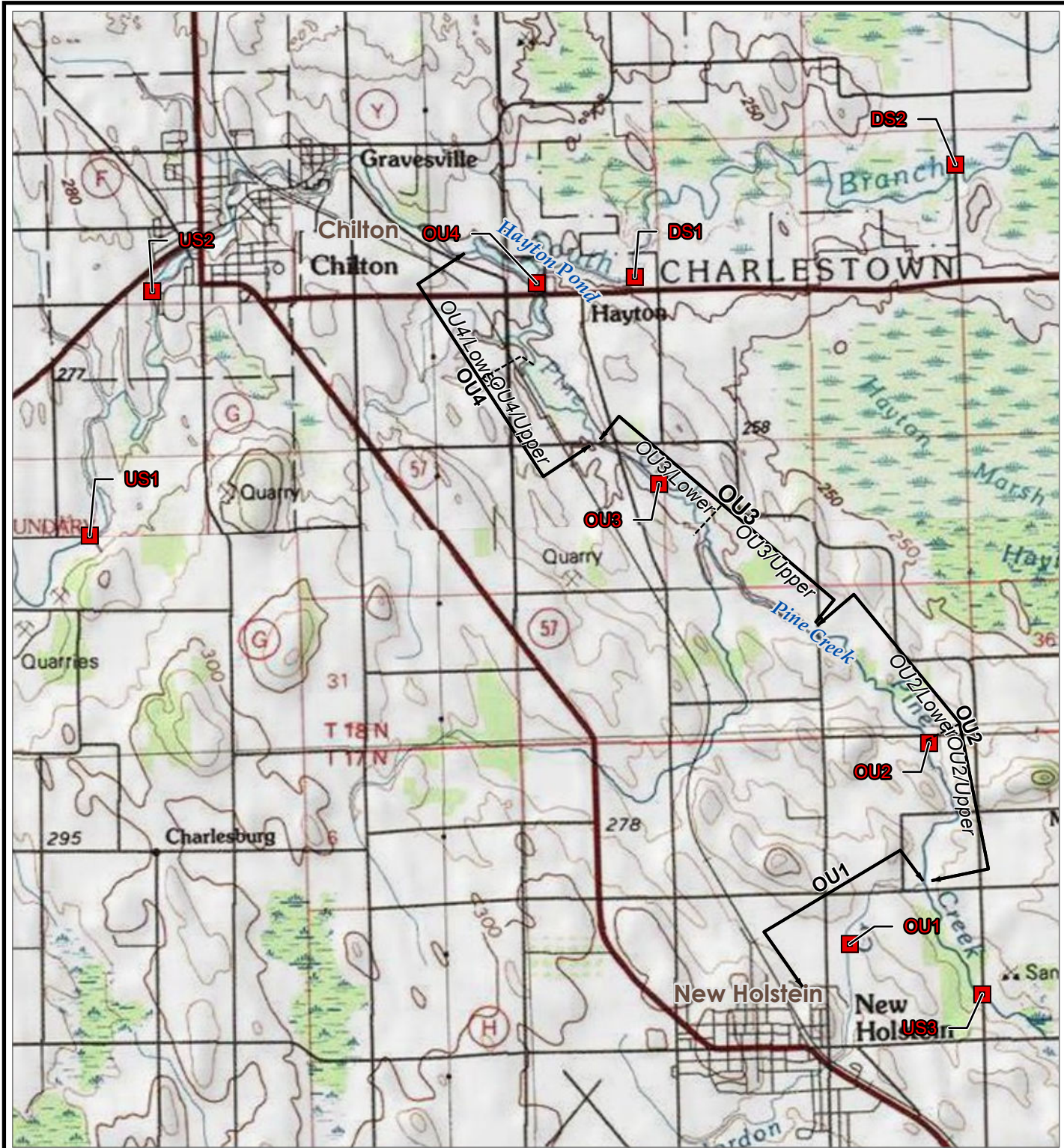


BASE MAP: USGS TOPO MAP
 DATA SOURCES: USGS, ESRI, TRC

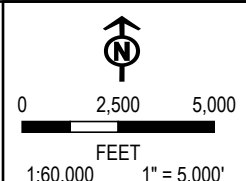


PROJECT: HARP	
POST-REMEDIATION NATURAL RECOVERY PLAN	
TITLE: SITE LOCATION MAP	
DRAWN BY: R. BARBER	PROJ. NO.: 449343.0000
CHECKED BY: A. HORRIE	FIGURE 1
APPROVED BY: C. HARVEY	
DATE: JANUARY 2023	
	
50 INTERNATIONAL DRIVE PATEWOOD PLAZA THREE, SUITE 150 GREENVILLE, SC 29615 PHONE: 864.281.0030	
FILE:	TECUMSEH

COORDINATE SYSTEM: NAD 1983 STATEPLANE WISCONSIN SOUTH FIPS 4803 FEET, MAP ROTATION: 0
 - SAVED BY: RSUEMNICHT ON 1/9/2023, 12:51:49 PM. FILE PATH: S:\1-PROJECT\TECUMSEH\HAR\PRX\TECUMSEH\TECUMSEH.APRX. LAYOUT NAME: FIG2 COLLECTION LOCATIONS 20220722



COLLECTION LOCATION



PROJECT: HARP	
POST-REMEDIATION NATURAL RECOVERY PLAN	
TITLE: NATURAL MONITORING RECOVERY FISH TISSUE COLLECTION LOCATIONS	
DRAWN BY: R. BARBER	PROJ. NO.: 471202.0000
CHECKED BY: A. HORRIE	FIGURE 2
APPROVED BY: C. HARVEY	
DATE: JANUARY 2023	
50 INTERNATIONAL DRIVE PATEWOOD PLAZA THREE, SUITE 150 GREENVILLE, SC 29615	
FILE:	TECUMSEH

BASE MAP: USGS TOPO MAP
 DATA SOURCES: USGS, ESRI, TRC