COMMUNITY INVOLVEMENT PLAN

TITTABAWASSEE RIVER, SAGINAW RIVER & BAY SITE

- Midland
- Saginaw
- Bay Counties, Michigan

JULY 2025

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INTRODUCTION

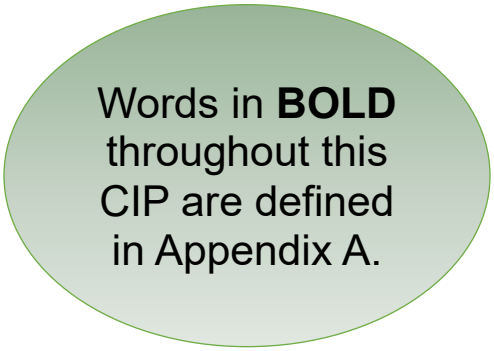
This document describes the purpose of this Community Involvement Plan, presents community outreach objectives, and provides an overview of the Superfund program.

The *Community Involvement Plan* is a working document that will evolve as the investigation and cleanup process continues and input is received from the community. It is intended to be flexible, adaptable and used as a guideline for our communication with the community.

The Tittabawassee River, Saginaw River and Bay site is a **Superfund Alternative Approach, or SAA,** site. The SAA program uses the same investigation and cleanup processes and standards for sites listed on the **National Priorities List**. For more information, please see the Superfund and Superfund Alternative Approach Overview section on Page 4 of this CIP.

U.S. Environmental Protection Agency, or EPA, developed this **Community Involvement Plan**, or **CIP**, as an update to the 2011 CIP for the Tittabawassee River, Saginaw River and Bay site in the Midland/Saginaw/Bay City region of Michigan. The work for this site is being conducted under the **Superfund Alternative Approach**, or **SAA**. This plan provides updated site information on **cleanup** activities, current status, community interviews and **community involvement** activities that have been and will continue to be conducted during the site investigation and cleanup.

The EPA prepared this CIP to inform, engage and support the communities near the site. The EPA's community involvement effort is committed to promoting effective and meaningful communication with the public. We want to make sure that (1) members of the affected communities know and understand when and how they can participate in decision-making during the cleanup activities at this site and (2) the communities' concerns and information needs are considered and addressed as activities at the site progress.



This CIP supports environmental and cleanup activities at and near the site. The EPA used several information sources to develop this plan, including research, discussions with community members and insight gathered at community interviews. The EPA scheduled in-person interviews with community members at the Saginaw Library from May 9 to 11, 2023; at the Thomas Township Library from May 23 to 25, 2023, and at the Bay City Library from June 5 to 7, 2023. Interviewees included local residents, local officials, members of local community groups and other parties interested in site activities and cleanup efforts.

The CIP describes the EPA's plan for continuing to address concerns and keep residents informed and involved in investigation and cleanup activities at the site. We will use this document as a guide to involve and communicate with residents, businesses and the local government in the Midland/Saginaw/Bay City region.

Community Outreach Objectives:

- Help the public understand their role in the decision-making process from site investigation through cleanup.
- Continue to give the public accessible, accurate, timely and understandable project information.
- Ensure adequate time and opportunity for the public to give informed and meaningful input.
- Respect and fully consider public input throughout the entire process.
- Be responsive to community concerns, questions and information needs.

If you are interested in submitting comments or have questions or suggestions concerning this CIP, please contact:

Diane Russell
Community Involvement Coordinator
EPA Region 5
989-395-3493
russell.diane@epa.gov

Amelia Holcomb
Community Involvement Coordinator
EPA Region 5
312-886-6242
holcomb.amelia@epa.gov

Additionally, the EPA, local, state and federal official contact information can be found in Appendix B.

Community Engagement for Successful Cleanups

Continuous community input and involvement are essential to our efforts to provide effective **community engagement**. Community input and feedback directly improves the EPA's decision-making. Community members should be involved in all phases of the investigation and cleanup to best address **contamination** in a way that protects people and the environment – now and in the future.

Residents, business owners, and local government officials can provide valuable information about a hazardous site to help the EPA determine the best clean-up approach. Information can help determine the location of contamination, how people may be exposed to the contamination and possible sources of the contamination.

Residents, business owners, and local officials of the Midland/Saginaw/Bay City region educated the EPA about their community and shared their concerns with, which are provided in the Community Interviews section beginning on Page 48.

Superfund and Superfund Alternative Approach Overview

Superfund is an environmental cleanup program enabled by a federal law enacted in 1980 known as the **Comprehensive Environmental Response, Compensation, and Liability Act**, or **CERCLA**. In 1986, another law, the **Superfund Amendments and Reauthorization Act**, or **SARA**, reauthorized CERCLA to continue Superfund cleanup activities. A site can also be cleaned through the SAA. The SAA uses the same investigation and cleanup processes and standards for sites listed on the Superfund **National Priorities List**, or **NPL**. The SAA is an alternative to listing a site on the NPL; it is not an alternative to the Superfund or the Superfund process.

The site is being investigated and cleaned up through the SAA. The SAA can potentially save time and resources associated with listing a site on the NPL. The EPA requires those responsible for contaminating Superfund sites, known as **potentially responsible parties**, or **PRPs**, to investigate and clean up those sites or reimburse the government if the EPA conducts cleanup at the site. As long as a PRP enters into an SAA agreement with the EPA, there is no need for the EPA to list the site on the NPL (although the site qualifies for listing on the NPL).

Once the EPA has been made aware of a site by individuals, local and state agencies or others, the EPA follows a step-by-step process to determine the best course of action to clean it up and protect human health and the environment. If the site poses an immediate threat to public health or the environment, the EPA can intervene with an **emergency response action**. In 2008 and 2009, an emergency response action occurred at the site; more information is provided in the Addressing High-use Properties section on Page 12. The goal of the EPA's Emergency Response and Removal Program is to protect the public and the environment from immediate threats posed by the release or discharge of **hazardous substances**.

Superfund site identification, monitoring and response activities are coordinated with state, tribal and territorial environmental protection and waste management agencies. The Dow Chemical Company, or Dow, is the PRP for the site; in January 2010, the EPA, the Michigan Department of Environment, Great Lakes, and Energy, or EGLE (formerly Michigan Department of Environmental Quality), and Dow signed an **administrative settlement agreement and order on consent**, or **Settlement Agreement**. A Settlement Agreement is a legal agreement formalizing that a PRP will perform all or part of a Superfund site cleanup.

For more information about the Settlement Agreement between Dow, the EPA and EGLE, please see the Site section beginning on Page 7.

The SAA program encourages active dialogue between communities affected by the release of hazardous substances and all the agencies responsible for carrying out or overseeing cleanup actions. The EPA considers community involvement to be an important part of the Superfund and SAA programs, and opportunities for community involvement occur throughout the process. At each step in the process, there are opportunities for various levels of community involvement; while this site is not on the NPL, the investigation, cleanup and the associated community involvement activities follow a similar path as displayed in the graphic on the next page. Community involvement activities for the site are further described in the Community Involvement section on Page 33.

Visit these EPA websites for more information on the Superfund process.

Superfund: *www.epa.gov/superfund*

Superfund Alternative Approach: *www.epa.gov/enforcement/superfund-alternative-approach*

Cleanup Process: *https://www.epa.gov/superfund/cleaning-superfund-sites*

Community Involvement: *https://www.epa.gov/superfund/superfund-community-involvement*

Effective April 7, 2019, the Michigan Department of Environmental Quality officially changed its name to the Michigan Department of Environment, Great Lakes, and Energy, or EGLE. All references in the CIP to that state agency will be EGLE, even when referring to actions taken when the agency was going by its previous name.

Community Involvement Activities Throughout the Superfund Remedial Process

Community Involvement Tools are bolded and in italics.

Required Activities

Discovery	PA/SI	Listing Process	RI/FS	ROD	RD/RA	O&M	NPL Deletion
		National Priorities List (NPL) Listing • ***Public notice*** • ***Public comments*** • Responsiveness summary • ***Technical Assistance Grant (TAG)*** notification	Remedial Investigation/Feasibility Study (RI/FS) • Conduct ***community interviews*** • Prepare ***Community Involvement Plan (CIP)*** • Establish ***information repository (IR)*** and administrative record ***- Public notice*** • ***TAG*** notification RI/FS Completion & Proposed Plan • ***Public notice*** • ***Public meeting*** • ***Public comments*** • Responsiveness summary	Pre-Record of Decision (ROD) Significant Changes • ***Public notice*** • ***Public comment*** • ***Public meeting*** • Responsiveness summary ROD Issuance • ***Public notice*** • ***Public comment*** • Review ***CIP*** & revise if necessary Post-ROD Significant Changes/ ROD Amendment • Issuance of an explanation of significant differences • ***Public notice*** • ***Public comment*** • ***Public meeting*** • Responsiveness summary	Remedial Design/Remedial Action (RD/RA) • ***Fact sheet*** on RD • ***Public meeting*** at RD completion prior to RA, if appropriate Consent Decree • *Federal Register* notice • ***Public comment*** • Responsiveness summary	Operations and Maintenance (O&M) • ***Five-year review*** • ***Five-year review*** results summary available in ***IR***	NPL Deletion • *Federal Register* notice announcing intent to delete • ***Public notice*** • ***Public comment period*** • Responsiveness summary • Add deletion docket to ***IR***

Recommended Activities

Discovery	PA/SI	Listing Process	RI/FS	ROD	RD/RA	O&M	NPL Deletion
	Preliminary Assessment/Site Inspection (PA/SI) • Meet with local officials & opinion leaders • ***Fact sheet*** • ***Risk communication*** • Designate a Community Involvement Coordinator	• Create website or ***social media*** page • Offer ***public meeting*** and webinar on Superfund process • Press release	• Presentations to community • Informational ***public meetings*** before RI begins • Regular community visits • ***Community advisory groups*** • ***Media*** visits • ***Public availability/poster sessions*** • Speak to schools and civic groups • Offer workshop on Superfund process • Regular briefings for local officials • ***Technical assistance needs assessment*** • Offer community visioning for site reuse • Contact the Conflict Prevention and Resolution Center (CPRC) for alternative dispute resolution (ADR) services	• Presentations to community • Offer site tour or virtual site tour • ***Public meetings*** or conference calls to explain ROD • Workshops or webinars on cleanup technology • ***Fact sheet*** to explain process	• Public briefing prior to RA • Presentations to community • Post on website or ***social media*** page • Contact CPRC for ADR services • ***Focus groups***	• Review ***CIP*** • Issue press release • Post on website or ***social media*** page • ***Communication strategy*** • ***Public meeting*** • ***Public availability/poster session***	• Ceremony or special event to commemorate completion and recognize community members

Community involvement and planning for a site's reuse and redevelopment are integral to the entire process

THE SITE

This section presents a description and history of activities at the site.

Aerial view of Dow facilities in Midland, Michigan. Source: https://digital.sciencehistory.org/works/qr46r122h

Site History

The 1,900-acre Dow Midland Plant began operations in 1897. The majority of the Midland Plant is located on the east side of the Tittabawassee River and south of the City of Midland.

Over the time of its operation, the Midland Plant has produced more than 1,000 different organic and inorganic chemicals. The chemicals include the manufacture of 24 chlorophenolic compounds since the 1930s.

Earlier in the history of the Midland Plant, wastes were discharged directly into the Tittabawassee River and, sometime later, wastes were stored and partially treated in ponds prior to discharge to the river. Other wastes were disposed of at the Midland Plant either on land or by burning. Over time, changes in waste management practices included installation and operation of a modern wastewater treatment plant and use of incinerators instead of open burning. Changes in the wastewater treatment plant and subsequent incorporation of pollution controls into both the operations of and **emissions** from the incinerators have reduced or eliminated non-permitted releases and emissions from the Midland Plant.

Overview of the Dow Midland Plant in 1954. Source: https://digital.sciencehistory.org/works/3f4625777

Flooding of the Midland Plant property may have also resulted in discharges to the Tittabawassee River of stored brines and untreated or partially treated process wastewaters. The primary source of **furans** and **dioxins** from the Midland Plant to the Tittabawassee River is believed to be historical releases of particulates in wastewaters to the river. The chlorine manufacturing process was the likely source of comparatively high furan **toxic equivalence concentration,** or **TEQ,** readings in and along the Tittabawassee River. Dioxins and furans found in more recent sediments may be related to chlorophenol productions that began in the mid-1930s.

EGLE issued Dow a **Resource Conservation and Recovery Act**, or **RCRA**, **hazardous waste** management facility operating license for the Midland Plant and is required to renew with the state per state requirements. Under its license, Dow has been conducting corrective action work.

Multiple rounds of sampling have been conducted at the site under the license, including extensive sampling for dioxins and furans, which has identified TEQ levels ranging from non-detect to over 100,000 parts per trillion, or ppt. for more information about the operating license, visit EGLE's website https://www.michigan.gov/egle/about/organization/materials-management/hazardous-waste/liquid-industrial-byproducts/dow-chemical/dow-midland-salzburg-landfill-operating-license.

Site Description

The site is the area located in and along the Tittabawassee River and its **floodplains**, starting just upstream of the Midland Plant and extending downstream to, and including, the Saginaw River and its floodplains and Saginaw Bay. Areas that are not part of the site include, but are not limited to, the City of Midland, generally, and the Midland Plant. Limited areas of the Tittabawassee River floodplain are located within the City of Midland and are part of the site.

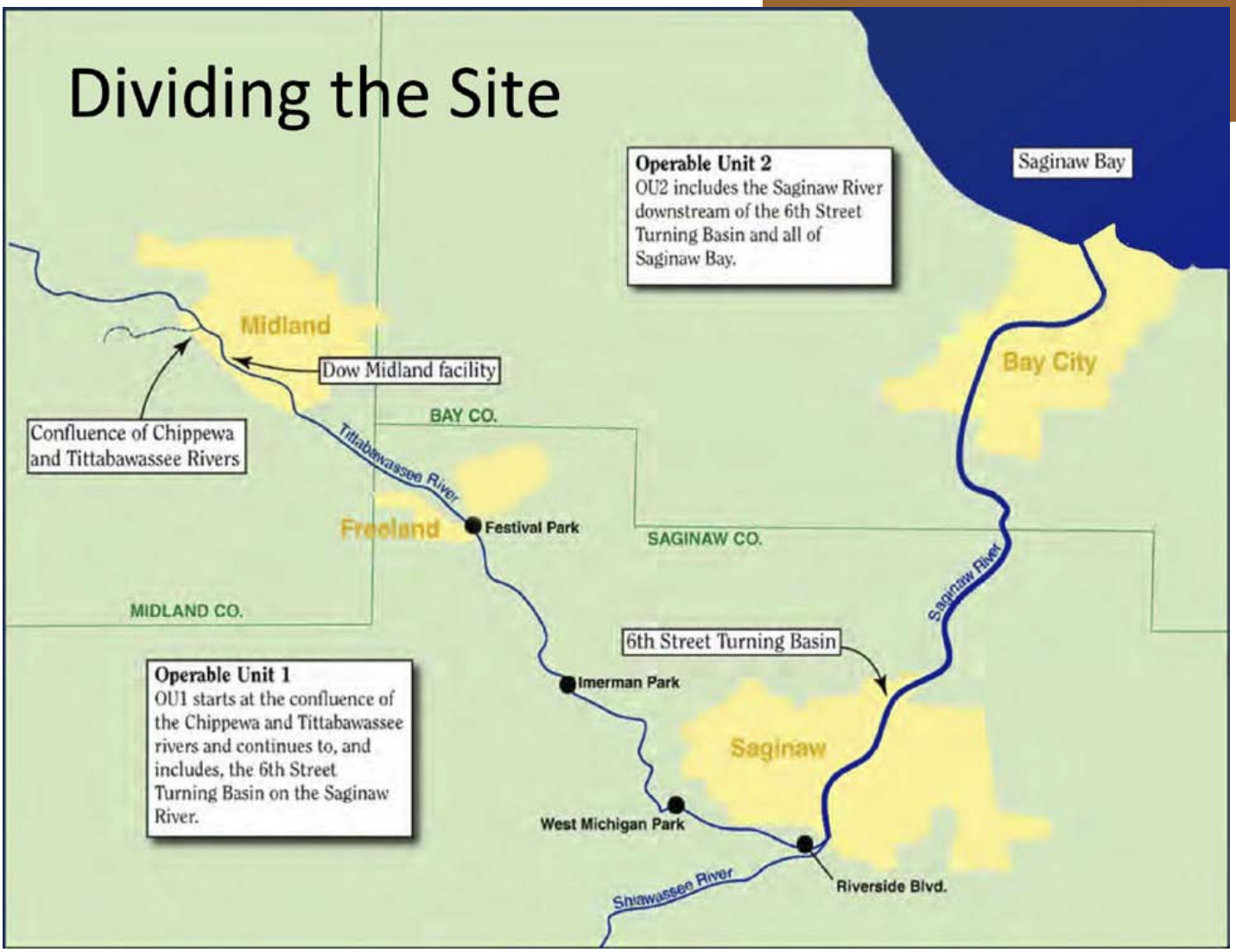
Aerial view of the Tittabawassee River in 2016. Source: https://www.ourmidland.com/news/article/EPA proposes 6M cleanup for next stretch of river 9284786.php

The site has been organized into two **operable units**, or **OUs,** and is divided further into segments within each OU.

The OUs are:

- OU1 – The Tittabawassee River and the upper Saginaw River. The upper Saginaw River is the Saginaw River down to the 6th Street Turning Basin. OU1 is further divided into seven segments. The first segment is the stretch of the Tittabawassee River that runs next to the Dow plant.
- OU2 – The lower Saginaw River and Saginaw Bay. OU2 is also divided into segments. These include the lower Saginaw River, Saginaw River floodplain and Saginaw Bay. Saginaw Bay is the area encompassed by the imaginary line between Au Sable Point and Point Aux Barques. The bay is considered to have an inner and outer bay, divided by the imaginary line between Au Gres and Fish Point.

Map of Operable Units



Site Cleanup Approach

In 2008, the EPA and EGLE began negotiations with Dow for a comprehensive cleanup approach to address contamination related to Dow for the site. In January 2010, the agencies approved a Settlement Agreement requiring Dow to perform investigations and develop and design cleanup options selected by the EPA.

Public Review and Comment

The EPA and EGLE did not sign the Settlement Agreement until after a thorough review by the public. Only then, after considering the comments received from the public, did the EPA and EGLE approve the agreement.

The agencies realized that the proposed settlement was a complex technical and legal document. In addition to a fact sheet and a **public meeting** to explain the agreement, the EPA provided independent 3rd party **technical assistance** to the community to review the proposed settlement. This assistance was provided by the EPA's **Technical Assistance Services for Communities** program through the Lone Tree Council and Tittabawassee River Watch.

The EPA and EGLE use the established Superfund processes and Dow is required to meet the same obligations as at any Superfund site. The EPA follows an established step-by-step process to determine the best way to clean up a Superfund site. The EPA prefers that the PRP clean up a site. The EPA ensures this by negotiating binding and enforceable settlement agreements with the PRP. Under the Settlement Agreement, Dow is to perform the following work:

- **Remedial Investigation and Feasibility Study**, or **RI/FS**: The RI/FS phase of the process determines the nature and extent of contamination at the site, develops cleanup options – such as **dredging**, **capping**, etc. – for addressing the contamination and evaluates and compares the performance and costs of the various cleanup options.
- **Remedial Design**, or **RD:** The RD phase of the process includes preparing for the cleanup at the site. It is during this phase that the engineering plans are developed for implementing the cleanup option the EPA selected.

Cleanup Approach

In addition to the Settlement Agreement, the parties negotiated a "statement of work" that details the specific tasks the company will perform. Each of these documents is about 75 pages long and are available on the EPA's website at www.epa.gov/superfund/tittabawassee-river.

The technical activities to be carried out under the Settlement Agreement cover the Tittabawassee River (from just upstream of Dow's Midland plant), Saginaw River, Saginaw Bay and their floodplains. The specific tasks outlined in the statement of work help the EPA and EGLE achieve their goal of a comprehensive cleanup built on existing information and the work already completed or under way.

The technical activities for this site fall into three critical categories:

- Limiting contact with bare floodplain soil in areas frequently used by people.
- Controlling movement of highly contaminated soil and **sediment** through **early actions**.
- Developing comprehensive long-term cleanup options for the rivers and their floodplains and Saginaw Bay.

Addressing "High-use" Properties

Activities required to address **"high-use" properties** along the rivers include gathering and assessing data, developing options to reduce exposures and designing the **mitigation** measures selected by the EPA after an open and transparent public participation process. These properties are called **exposure units**, or **EUs**, and activities began right away under the settlement.

A barrier such as ground cover is placed over the floodplain soil to limit contact with underlying soil.

To qualify for early cleanup actions, a portion of the property had to be located within a frequently flooded area, the property had to be actively used, and there had to be bare soil within the actively used floodplain. Early removal action, including soil sampling, removal and restoration, began at EU001 in 2008.

Initially, the EPA and EGLE identified 21 EUs. In 2008 and 2009, EUs 001 and 002 were addressed through the EPA emergency response actions to address contaminated floodplain soils, while EU003 was determined not to need early actions. The remaining 18 EUs, which included approximately 260 property parcels, were addressed under the 2010 Settlement Agreement.

Addressing the Movement of Contaminated Soil and Sediment

Activities required to address the movement of highly contaminated bank soil and sediments include gathering and assessing data, developing options to reduce the movement of highly contaminated banks and sediments, and designing the mitigation measures selected by the EPA after an open and transparent public participation process. These **accelerated cleanup activities** began right away under the settlement. This work built on early cleanup activities conducted in the Tittabawassee River when cleanups were divided into designated sections called "reaches."

Between 2006 and 2010, activities occurred at Reaches B, D, J/k, M and O, areas adjacent to the Dow Midland Plant property or downstream and Wicks Park on the Saginaw River. Cleanup activities included:

- Soil and sediment removal
- Sediment capping
- Riverbank restoration
- Riverbank **erosion** stabilization (including planting native vegetation)

Examples of accelerated cleanup activities that were conducted under the Settlement Agreement include:

- Reach O – A riverbank stabilization **pilot project** was completed in 2010 at Reach O to prevent contaminant erosion from the bank into the river. The project uses several different erosion control technologies for short-term protection, while native vegetation grows and ultimately stabilizes the bank.

- Reach J – An in-channel capping pilot project was completed in 2010 at Reach J to stabilize buried contaminants. The project evaluates an innovative approach to stabilize contaminated sediment by placing a grid-shaped geocell material on top of the deposit and having clean material fill the grids and create a cap.
- Island MM – Island MM, located in Segment 5 of the Tittabawassee River, contained high levels of dioxin and was eroding over time. To control the movement of dioxin, the top part of the island above water was removed in 2011, and the remaining sediment was capped to let the island restore itself naturally.

Geocell material placed in Reach J in 2010.

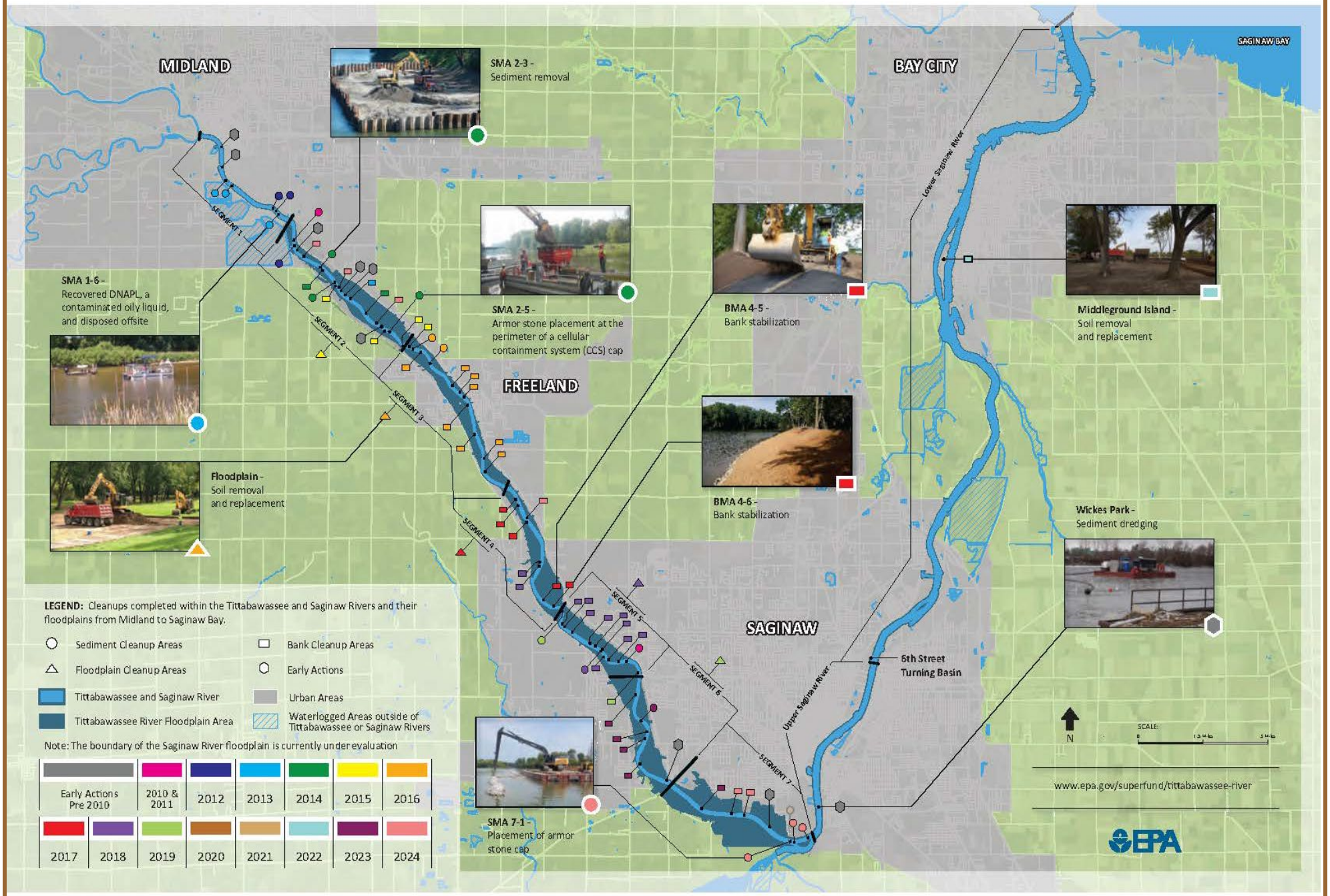
Comprehensive Cleanup

Several activities outlined in the Settlement Agreement provide the framework for developing comprehensive cleanup options in an **upstream-to-downstream** fashion for the Tittabawassee River, Saginaw River and Saginaw Bay. First was dividing the river systems and bay into manageable pieces (OU1 and OU2). OU 1 has been divided into seven segments of the Tittabawassee River and a portion of the upper Saginaw River. These sections range from 3 to 5 miles long, and cleanup work has been conducted in stages from upstream to downstream, segment-by-segment, ensuring each section is cleaned up before moving on to the next. The site was segmented to ensure a comprehensive cleanup approach for an entire segment, including floodplains, sediment and riverbanks. Cleanups target specific areas in each segment called **Sediment Management Areas**, or **SMAs**, and **Bank Management Areas**, or **BMAs**. EPA's community guide for SMAs and BMAs can be found in Appendix F of this document.

The EPA-selected cleanups have been underway for several years. Dow has implemented these actions with the EPA and EGLE oversight. The main goals for SMAs and BMAs are 1) to limit the spread of dioxin-contaminated riverbank soil and sediment to reduce dioxin levels farther downstream and 2) to help keep dioxins from building up in the Tittabawassee River fish.

SMA cleanups typically involve digging up contaminated sediment and disposing of it or covering contaminated sediment to keep it safely in place. BMA cleanups usually include technologies that stabilize the bank to stop the erosion of contaminated riverbank soil. Bank stabilization always includes planting deep-rooted, erosion-resistant, native vegetation. The map on the next page shows BMA and SMA cleanups completed for the site since 2010.

Riverbank erosion stabilization. Tarp (left) and grids (right) placed over riverbank soil and backfill to prevent erosion.


MIDLAND
SMA 2-3 -
Sediment removal
BAY CITY
SAGINAW BAY
Lower Saginaw River
SEGMENT 1
SMA 1-6 -
Recovered DNAPL, a contaminated oily liquid, and disposed offsite
SEGMENT 2
SMA 2-5 -
Armor stone placement at the perimeter of a cellular containment system (CCS) cap
BMA 4-5 -
Bank stabilization
Middleground Island -
Soil removal
and replacement
FREELAND
SEGMENT 3
BMA 4-6 -
Bank stabilization
Floodplain -
Soil removal
and replacement
Wickes Park -
Sediment dredging
SEGMENT 4
SEGMENT 5
SAGINAW
6th Street
Turning Basin
SEGMENT 6
Upper Saginaw River
SEGMENT 7
SMA 7-1 -
Placement of armor stone cap
LEGEND: Cleanups completed within the Tittabawassee and Saginaw Rivers and their floodplains from Midland to Saginaw Bay.
Sediment Cleanup Areas
Bank Cleanup Areas
Floodplain Cleanup Areas
Early Actions
Tittabawassee and Saginaw River
Urban Areas
Tittabawassee River Floodplain Area
Waterlogged Areas outside of Tittabawassee or Saginaw Rivers
Note: The boundary of the Saginaw River floodplain is currently under evaluation
Early Actions Pre 2010
2010 & 2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
N
SCALE:
www.epa.gov/superfund/tittabawassee-river
EPA

Operable Unit 1

Bank stabilization to prevent soil erosion.

The primary activities in OU1 include assessing existing data and gathering additional data as necessary, developing segment-specific cleanup options and designing the EPA-selected option after an open and transparent public participation process and evaluating the risk remaining after cleanups have been implemented. Activities in OU1 have and will build on the data, investigations, cleanups and other work that has already been completed. The activities for OU1 began right away under the Settlement Agreement, and much of the cleanup activities in the Tittabawassee River have been completed in September 2024. Assessments of the upper Saginaw River have started as work shifts to the Saginaw River and Bay (see timeline on Page 20 for a summary of activities).

Operable Unit 2

The primary activities in OU2 include gathering and assessing data, evaluating risk, developing cleanup options and designing the EPA-selected option after an open and transparent public participation process. Since it is expected that conditions will change in the Saginaw River and Bay because of cleanup activities completed upstream, the activities for OU2 began once the work on the Tittabawassee River was complete, with early actions, like the Middleground Island cleanup, taken as needed.

Other Key Elements of the Cleanup Approach

Many of the activities to be completed under the Settlement Agreement are expected to fulfill requirements under the RCRA license that was issued to Dow by EGLE (see Site History on Page 8). As part of the settlement, EGLE, working as a partner with the EPA, reviews the activities being completed in "real-time" to ensure the requirements of the license are met. If necessary, EGLE can require additional work beyond that identified in the Settlement Agreement to meet the license requirements. As part of the Settlement Agreement, EGLE proposed a modification to the license to clarify how the license and the Settlement Agreement work together. This modification went through the state's usual public comment and review procedures and was approved in May 2010.

The Settlement Agreement also provides dispute resolution processes. These are the processes that the EPA, EGLE and Dow use to resolve any disagreements under the settlement. The processes are designed to achieve quick resolution of disagreements so activities can continue without significant delay. Depending on the type of disagreement, the EPA or EGLE has primary responsibility to decide how to resolve disagreements.

The next section details the completed actions taken at the site.

Completed Actions

Segment 1, a 3-mile stretch next to the Midland Plant, is the most upstream segment. The cleanup started in 2012 and finished in 2013. The Segment 1 cleanup removed and treated **dense non-aqueous phase liquid**. A containment system was installed at five SMAs in Segment 1 to isolate contaminated sediment. Since 2013, the area has been monitored, and containment systems are maintained.

Segment 2 is a 4-mile stretch of the river below the Midland Plant. The cleanup took place in 2014 and 2015. The cleanup plan built on previous work, removing contaminated sediment in some areas and stabilizing contamination from moving into others. Nearly 23,000 cubic yards of contaminated sediment were removed, and about 2.3 acres of contaminated sediment was isolated and contained. Close to a mile of riverbank was stabilized to keep eroding contaminated soil from washing back into the river.

Segment 3 is a 4-mile stretch of the river that starts about 7 miles below where the Chippewa River meets the Tittabawassee River. The Segment 3 cleanup, conducted in 2016 through a 2016 Settlement Agreement, included stabilizing about 1.2 miles of eroding BMAs. Many different stabilization technologies were used on the BMAs. One of the most important elements was using deep-rooted native plants placed along the riverbanks. Two SMAs were cleaned by a combination of digging up contaminated sediment in dry conditions and removing it and covering contaminated sediment to keep it safely in place.

Segments 4 and 5 consist of a 6-mile stretch of the river that starts about 11.5 miles downstream of the Dow Midland Plant. The EPA selected a cleanup plan for Segments 4 and 5 of the Tittabawassee River in early 2017. Like the upstream segments, there are distinct SMAs and BMAs in Segments 4 and 5. A combination of technologies was implemented for the SMAs, including digging and removing some contaminated sediment, safely covering other areas of contaminated sediment, and monitoring areas where contamination was left in place. Cleanup technologies that stabilize BMAs and stop erosion of contaminated riverbank soils were applied as well. Work in Segments 4 and 5 was largely completed in 2017 and 2018. In Fall 2022, Dow completed cleanup in Segment 5 at one SMA.

Segments 6 and 7 consist of a 6.7-mile stretch of the river that starts 17.7 miles downstream of the Dow Midland Plant. In 2019, the EPA selected a cleanup plan for seven BMAs and four SMAs through a 2019 settlement agreement, and the work is ongoing. The EPA built upon lessons learned from upstream segments. In 2023, the EPA identified two additional BMAs in Segment 6, referred to as BMA 6-2 and BMA 6-3, located on the southwest bank of the Thomas Township Nature Preserve on an inside bend of the Tittabawassee River.

Tittabawassee River Floodplain

The EPA selected a cleanup plan for contaminated soil in frequently flooded areas along the Tittabawassee River in 2015, and the multi-year floodplain cleanup started that same year through a 2015 Settlement Agreement. Many properties in the Tittabawassee River Floodplain were evaluated for cleanup. The Tittabawassee River Floodplain is focused on the 8-year floodplain and includes about 4,500 acres and extends 21 miles of the river below Dow's Midland Plant. The EPA's floodplain cleanup will protect all people who live, work and play along the Tittabawassee River. Not all areas in the floodplain will need a cleanup due to different land uses of floodplain properties. The EPA's plan uses a combination of steps for cleanup.

Public floodplain property before (left) and after (right) floodplain cleanup work.

If tests show a contamination level greater than 250 ppt in homeowners' yards that are maintained for typical backyard uses, soil will be dug up and hauled away. Soil will be replaced, and grasses and plants will be restored. If tests show a contamination level greater than 2,000 ppt for other areas, such as farms, parks, commercial properties and natural areas, soil will either be dug up and hauled away or covered with clean soil. More information on the floodplain cleanup can be found in Appendix E of this document.

In the fall of 2023, Dow began the cleanup of 5.9 acres of the Thomas Township Nature Preserve, located along Segment 6 of the Tittabawassee River. The soil was dug up and replaced with clean soil and seeded following the agreed-upon planting plan developed in coordination with Thomas Township.

The EPA works with each property owner on the right approach, and after cleanup, these areas are replanted and restored. By the end of 2024, about 110 areas have been cleaned up, and hundreds more were assessed that do not need cleanup.

Dow has conducted cleanups in Segments 1 through 7 from 2012 to 2024, and active construction work along the Tittabawassee is now complete. Over 370,000 cubic yards of soil and sediment have been removed and properly disposed of from the Tittabawassee River SMAs, BMAs and floodplain.

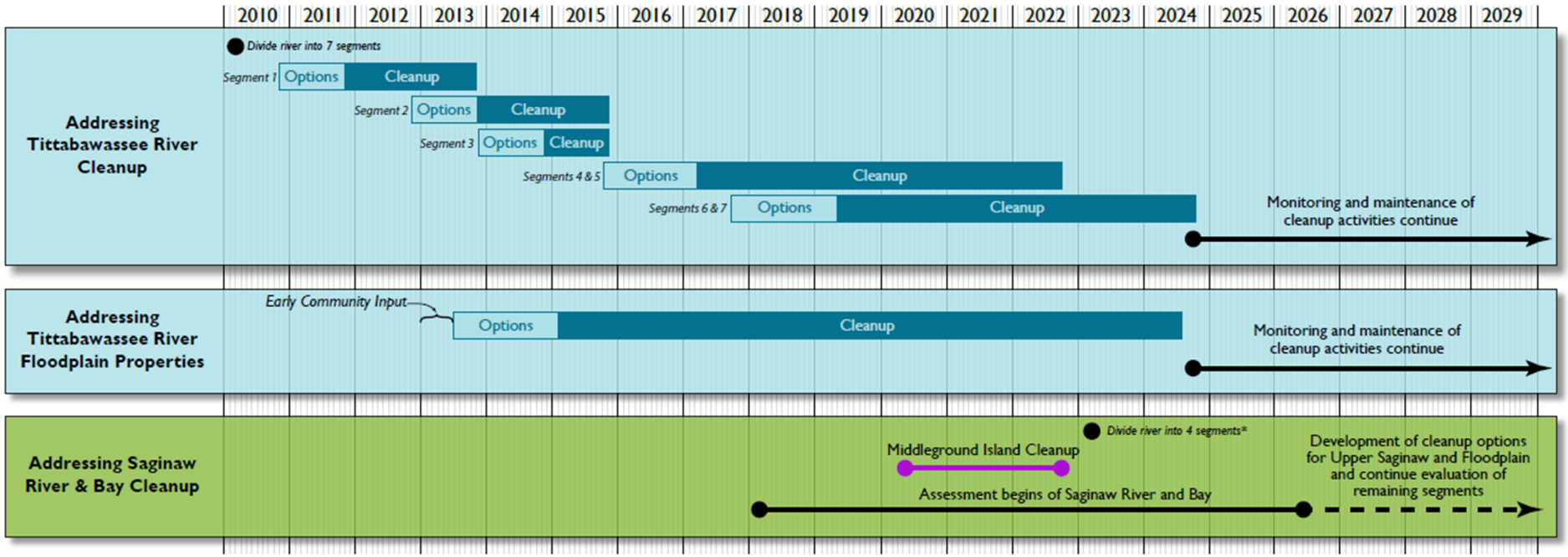
Restoration work along the Tittabawassee River floodplain.

Saginaw River and Bay

Saginaw River and Bay is now in the beginning stages of evaluation and cleanup. The 22-mile Saginaw River is divided into segments: Upper Saginaw River (4.8 miles), Lower Saginaw River (17 miles), the Saginaw River floodplain and Saginaw Bay. In 2018 and 2019, Dow took soil samples from several residential areas in the Saginaw floodplain. Because soil sample results were higher on Middleground Island residential properties than the established cleanup number, the EPA, working with EGLE, selected a cleanup plan in 2020 for Middleground Island before the rest of the Saginaw floodplain areas. Middleground Island is in the Saginaw River, about 7 miles upstream of Saginaw Bay. Similar to the cleanup for the Tittabawassee River floodplain, contaminated soil was dug out and replaced with clean soil, and the yards were restored. Cleanup was completed in 2022. A total of 40,300 cubic yards of soil were removed from 17 yards on Middleground Island in 2022. Dow is now working with the EPA to evaluate the Saginaw River and floodplains and began field sampling to fill data gaps in the summer of 2023.

The next page shows a timeline of past, current and future cleanup activities in OU1 and OU2.

Project Timeline



● Early Action taken based on data

* Upper Saginaw River, Lower Saginaw River, Saginaw River Floodplain and Saginaw Bay

Key Projects in the Watershed

The below sections summarize other ongoing projects in the Tittabawassee River, Saginaw River and Saginaw Bay. These projects complement the EPA's work in the area.

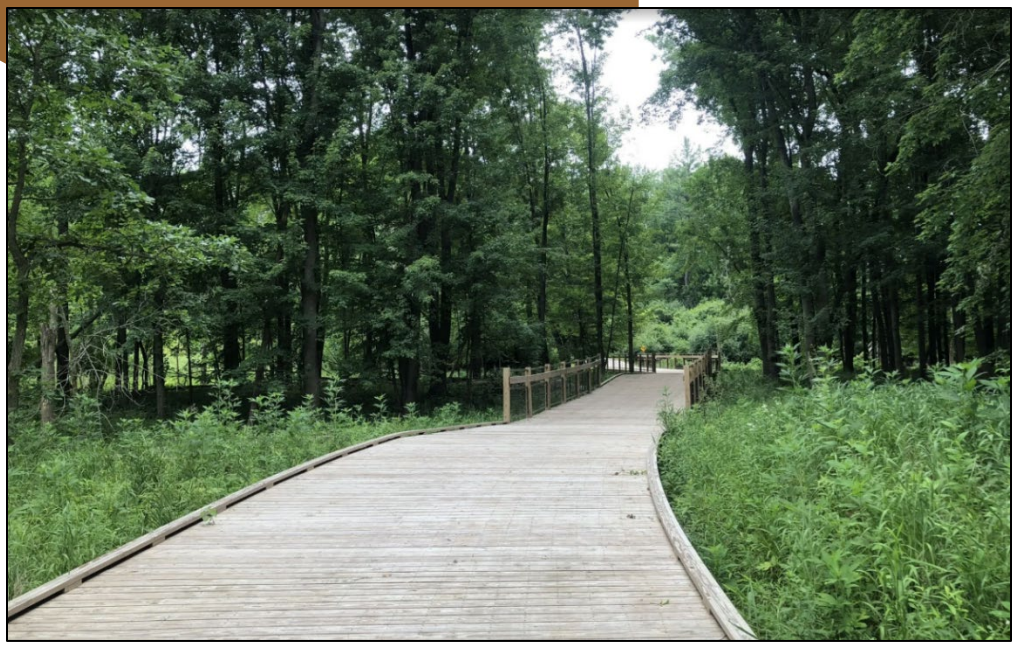
Tittabawassee River Natural Resource Damage Assessment and Restoration

In the EPA's Superfund Program, responsibility for the protection of **natural resources** falls with federal, tribal and state trustees. This is because no one individual "owns" a natural resource; rather, they are held in trust for the public. The Natural Trustees review and comment on plans, reports and other documents submitted under the Settlement Agreement. In addition, the Settlement Agreement does not change the Trustees' ability to continue their assessment of natural resource damages or to hold Dow accountable for any damages.

Natural Resource Trustees have conducted a **Natural Resource Damage Assessment**, or **NRDA**, because dioxins have injured natural resources downstream from Dow's Midland plant. The Trustees for the Tittabawassee River System are the state of Michigan, acting through the director of EGLE, the director of the Michigan Department of Natural Resources and the Michigan Attorney General; the U.S. Department of Interior, acting through its representatives, the U.S. Fish and Wildlife Service and Bureau of Indian Affairs; and the Saginaw Chippewa Indian Tribe of Michigan.

An NRDA determines the amounts and types of restoration that can make up for losses to natural resources over time. In 2005, the Trustees began planning for and conducting their assessment, and in 2019, the Trustees reached a settlement with Dow. The settlement is for an estimated $77 million in projects and funding that will restore fish, wildlife and habitats injured following releases of hazardous substances in past decades from Dow's manufacturing facility in Midland. The Trustees published the Final Restoration Plan and Environmental Assessment for the Tittabawassee River System on March 10, 2020.

The new section of the Tittabawassee River Trail at Hayes Park, completed through the NRDA, opened in June 2024. Source: David Bender via All Trails: www.alltrails.com/trail/us/michigan/tittabawassee_river_trail/photos



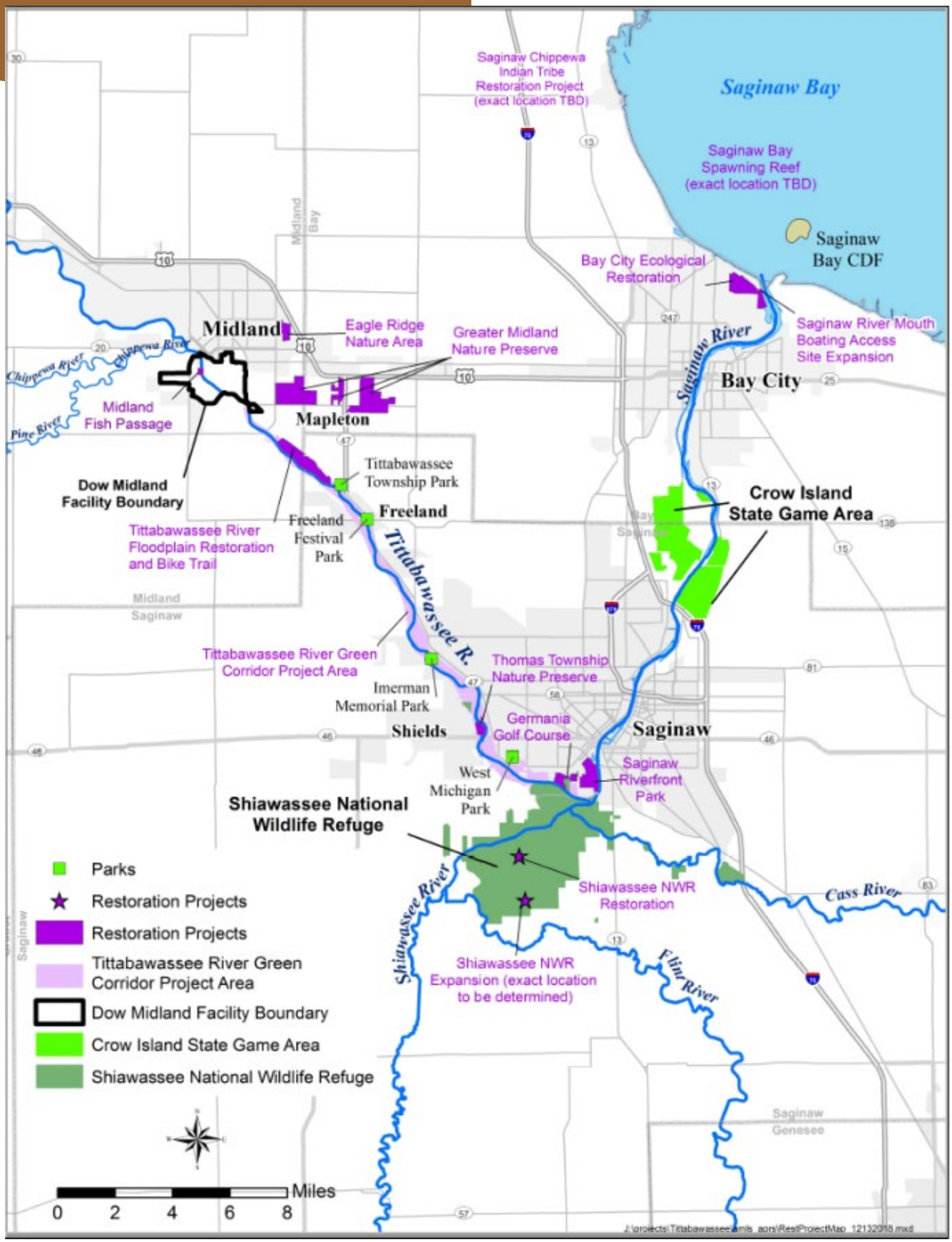
The settlement does not affect the ongoing cleanup process, and the restoration work is progressing as the cleanup efforts continue.

The map on the next page shows locations of proposed restoration projects to be implemented and funded by Dow. For more information, a list of current restoration projects, and additional restoration projects to be funded by the settlement, please visit the U.S. Fish and Wildlife Service Tittabawassee River Natural Resource Damage Assessment and Restoration webpage at:

www.fws.gov/project/tittabawassee-river-natural-resource-damage-assessment-and-restoration.

Locations of Proposed Restoration Projects to be Implemented by Dow

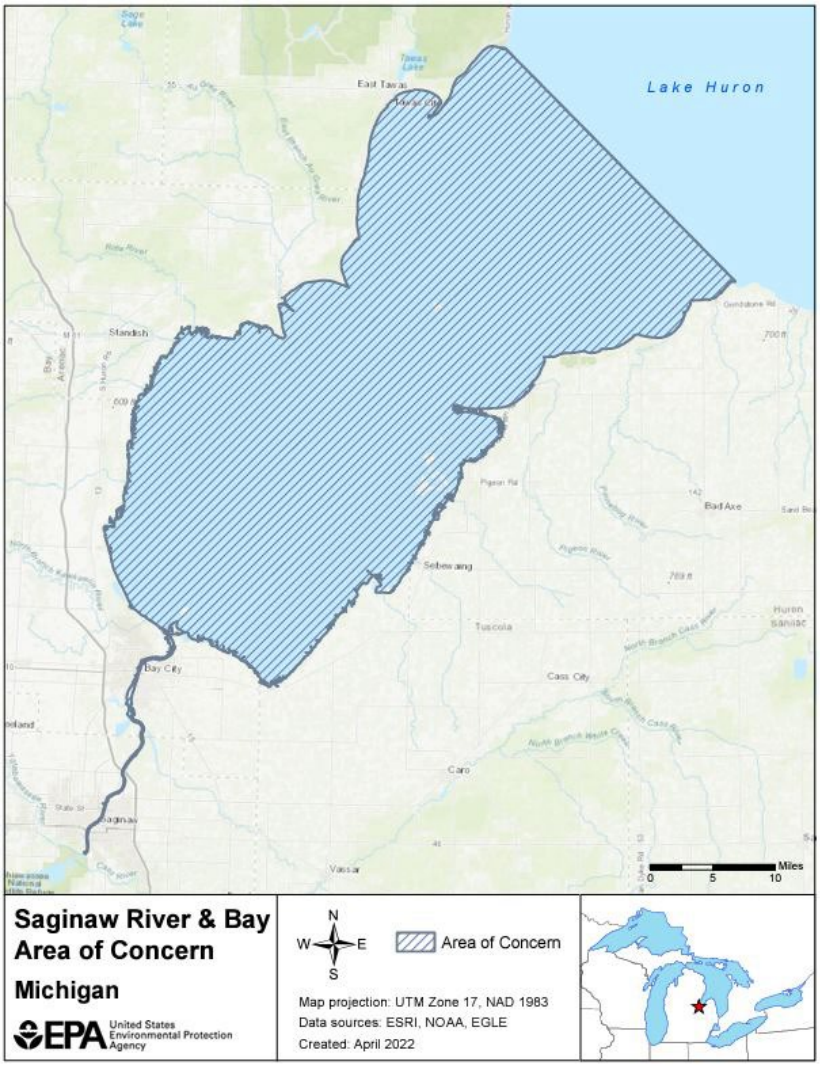
Source: www.fws.gov/project/tittabawassee-river-natural-resource-damage-assessment-and-restoration



Saginaw River and Bay Area of Concern

The Saginaw River and Bay were designated as an **Area of Concern (AOC)** under the 1987 Great Lakes Water Quality Agreement. Contaminated sediments, fish consumption advisories, degraded fisheries and loss of significant recreational values are reasons for this AOC designation. Saginaw River and Bay priorities include nonpoint pollution control, wetland and habitat restoration and remediation of sediment contaminated with dioxin, **Polychlorinated Biphenyls**, or **PCBs**, and other organics.

An interim success of remediation and restoration work is removing **Beneficial Use Impairments**, or **BUIs**. BUIs are designations given by the EPA representing different types of significant environmental degradation. As cleanup work is completed, and monitoring demonstrates sufficient environmental health improvements, BUIs can gradually be removed. The list below shows what BUIs have been removed and what remain at the Saginaw River and Bay AOC.



- Restrictions on Fish and Wildlife Consumption
- Eutrophication or Undesirable Algae
- Tainting of Fish and Wildlife Flavor – Removed in September 2008
- Restrictions on Drinking Water Consumption or Taste and Odor Problems – Removed in June 2008
- Degradation of Fish and Wildlife Populations
- Beach Closings
- Degradation of Aesthetics
- Bird or Animal Deformities or Reproduction Problems
- Degradation of Benthos
- Degradation of Phytoplankton and Zooplankton Populations
- Restrictions on Dredging Activities
- Loss of Fish and Wildlife Habitat – Removed in May 2014

To learn more about the remediation and restoration work in the Saginaw River and Bay AOC, please visit the EPA's Saginaw River and Bay Area of Concern webpage at: www.epa.gov/great-lakes-aocs/saginaw-river-and-bay-aoc.

Wild turkeys roaming on the Tittabawassee River floodplain.

Turtle on the bank of the Tittabawassee River.

Saginaw and Bay County Cooperative Agreement

The Saginaw and Bay County Cooperative Agreement, or SBCA, receives funding from the Michigan Department of Health and Human Services Environmental Health Bureau, or MDHHS, to provide the public with information to minimize non-occupational site-related chemical exposures with an emphasis on exposures from fish consumption, wild game and chicken, particularly by sensitive and high-risk populations (women of child-bearing age, young children, people using local fish and wild game as a source of protein, etc.).

How can you be exposed to dioxins and furans?

When you eat contaminated food, or breathe or swallow contaminated soil or dust, dioxins and furans get into your body. These chemicals can build up in your body and stay for years, even decades.

Dioxins and furans are in the Tittabawassee and Saginaw Rivers.

Dioxins and furans build up in bottom feeding fish and fish that eat other fish. The chemicals are stored in the filet and fat.

When the rivers flood, dioxins and furans get on the land.

Grazing wild animals, such as deer and turkey also have the chemicals in their meat, organs, and fat.

Dioxins and furans are in the soil and dust in these areas.

Grazing domestic animals eat some soil and dust when they graze on contaminated soil. The chemicals build up in the meat, fat, milk, and of the animals and in poultry eggs.

Soil or dust on the skin of homegrown fruits and vegetables can have dioxins and furans.

Can dioxins and furans make you sick?

Exposure to dioxins and furans will not make you sick right away and does not mean that you will become sick.

Too much exposure to dioxins and furans over time can contribute to:

- cancer
- heart disease
- diabetes

and can harm your:

- liver
- immune system
- hormones
- brain development
- reproductive health and fertility
- tooth development

People with serious health problems, babies, and children are at greatest health risk.

What about breastfeeding your baby?

Dioxins and furans can be passed to your baby through breast milk. Breastfeeding is linked to many benefits for babies and nursing mothers. Current research shows that the health benefits of breastfeeding outweigh health risks, so moms are encouraged to breastfeed. If you have concerns about breastfeeding your baby, talk to your doctor.

Graphic from Dioxins, Furans, and your Health along the Tittabawassee and Saginaw Rivers brochure: https://www.michigan.gov/mdhhs/media/Project/Websites/mdhhs/Folder2/Folder76/Folder1/Folder176/Dioxin_Exposure_and_Health_Final.pdf?rev_85f0526c29ad40c48a3b0dc73857a085&hash_8673046D8A7FC7589D582E851DEBA4BF

In April 2009, the EPA awarded a $75,000 grant to the MDHHS, to support an ambitious pilot program for community outreach on public health issues associated with eating local fish and wild game, especially at subsistence levels. It also funded an environmental education program aimed at middle school students. Additional funding was made available through the Settlement Agreement, now nearing $1.5 million in support of this program. The EPA and the MDHHS work with community leaders on the best ways to share relevant information with the community at large. The EPA reviews the SBCA scope of work annually to address evolving communication needs at the site.

Contaminants in the rivers can bioaccumulate, meaning these chemicals build up in organisms throughout the food chain, exposing humans to contaminants. Eating contaminated fish and game, as well as frequent direct contact with contaminated soils or sediments, are the primary exposure routes of concern to humans. Elevated concentrations of these contaminants, specifically along the Tittabawassee River, Saginaw River and portions of Saginaw Bay and their floodplains, have resulted in public health consumption advisories. EGLE, the Department of Agriculture and Rural Development and MDHHS have issued advisories to the public related to the movement of contaminated soils, raising domesticated animals for food or food products on contaminated soils and gardening best practices.

Through the SBCA, the MDHHS works with the EPA Region 5 Information Office in Flint, Michigan, and local partners in Saginaw and Bay Counties to increase awareness and knowledge among residents about local fish, game and floodplain soil advisories. The SBCA aims for the following outcomes:

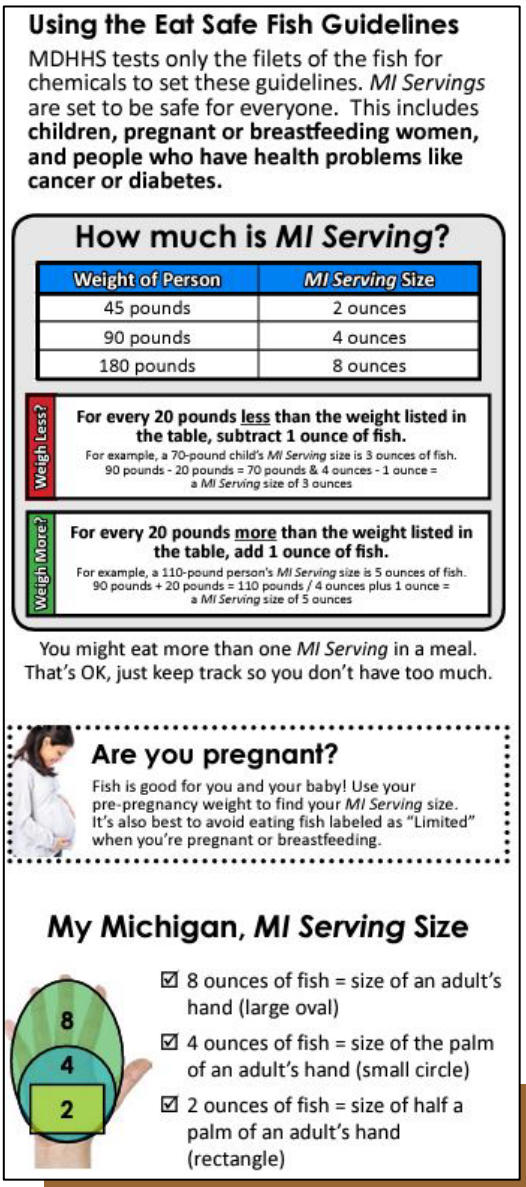
1. Establish sustainable and local sources of information about Saginaw, Midland and Bay County persistent and bioaccumulative contaminants.
2. Increase awareness about local issues related to fish and wild game consumption, contaminants, and health.
3. Increase knowledge about exposure pathways.
4. Increase knowledge of how to minimize exposure to site-related hazardous chemicals.
5. Increase compliance with following public health advisories (long-term).
6. Reduce contaminant exposure via increased compliance with public health advisories (long-term).

This program also compliments and is integral to the EPA's community involvement activities, outlined in the next section.

Michigan Fish Advisory

Tittabawassee and Saginaw Rivers and Saginaw Bay fish have elevated chemical contaminant concentrations that cause fish consumption advisories. In cooperation with the EPA, the Bay County Health Department, the Saginaw Department of Public Health and the MDHHS, are working to teach people who live in the area near the Tittabawassee and Saginaw Rivers and Saginaw Bay about **fish advisories** to protect their health and ensure everyone is choosing safe fish to eat. The Michigan fish consumption advisory states that nobody should eat carp or white (silver) bass from the Tittabawassee and Saginaw Rivers and Saginaw Bay. Additionally, catfish should not be eaten from the Tittabawassee or Saginaw Rivers.

In June 2007, MDHHS (at the time known as Michigan Department of Community Health) released a report on the fish consumption patterns of people who were interviewed while fishing the Tittabawassee River, Saginaw River, Shiawassee River or Saginaw Bay. The objective of the study was to characterize the fish consumption patterns of people who harvest and eat fish from waters in the Saginaw Bay Watershed. The study focused on Saginaw Bay Watershed waters that were frequently fished by large numbers of people. The study verified that most fishers live locally and fish in these waters regularly. The study interviewed 1,088 people fishing the Saginaw Waters. A total of 907 fishers reported eating fish from waters in Michigan, and 634 fishers stated they ate fish from the waterbody they were fishing at the time of the interview. Of the 1,088 people interviewed, 786 were



Source: https://www.michigan.gov/_/media/Project/Websites/mdhhs/Folder2/Folder24/Folder1/Folder124/EAT_SAFE_FISH_IN_THE_SAGINAW_BAY_AREA.pdf?rev=cd066a194ff747a99a22e95f3bb25152

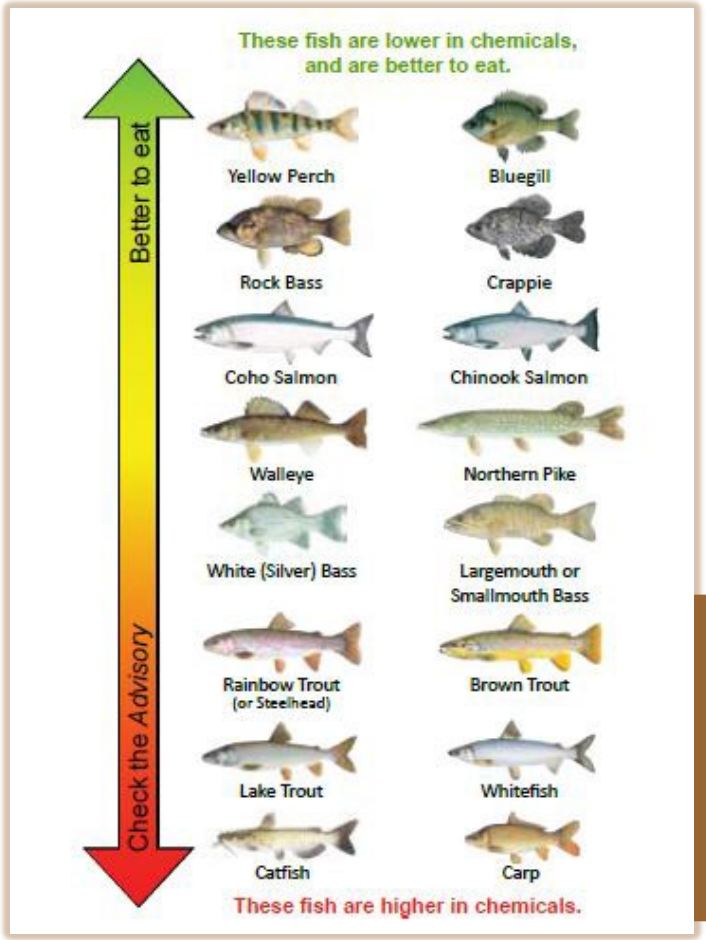
white, 95 were black, and 15 were various non-white racial backgrounds. The results from the study are summarized below:

- Approximately 80 percent of the fishers who eat the fish feed the fish to their family members.
- Minorities, females, bottom-feeding fish consumers and shoreline fishers were less aware of the state fish advisories.
- Some people only eat bottom-feeding fish, including carp.

Each year, the MDHHS produces an Eat Safe Fish Guide for specific areas in Michigan. The MDHHS scientists test edible portions of fish from waterbodies in Michigan and use the test results to find the amount of chemicals in most fish from a certain species from that waterbody. The results are used to determine what fish are safe to eat and how much fish is safe to eat per month.

To view the current Eat Safe Fish Guide for Southeast Michigan, visit https://www.michigan.gov/mdhhs/-/media/Project/Websites/mdhhs/DEH/Eat-Safe-Fish/Documents/SE_EAT_SAFE_FISH_GUIDE_-_SOUTHEAST_MI_WEB.pdf?rev=d8057726d65947f5aa65faf50f39ff4d&hash=176CC3D7E9DD676DCEE33CC0F587F929

The tables below summarize the fish guidelines for Saginaw Bay, the Saginaw River and the Tittabawassee River. The current Eat Safe Fish brochure can be found here: https://www.michigan.gov/mdhhs/-/media/Project/Websites/mdhhs/Safety-and-Injury-Prevention/Environmental-Health/Eat-Safe-Fish/Documents/family_fish.pdf?rev=dd1d221eed32476eb3fa1631645a5a55&hash=3E3FD299965029209067A0D9D5389D59



If you only occasionally eat fish caught from Michigan waters, use this chart to choose fish that are generally safer for you and your family to eat. *Note: This chart does **NOT** apply when perfluorooctane, or PFOS, a man made chemical that belongs to the per and polyfluoroalkyl substances, or PFAS, family.*

Saginaw Bay Fish Guidelines

Type of Fish	Chemical(s) of Concern	Size of Fish (length in inches)	MI Servings per Month
Carp	PCBs and dioxins	Any	Do Not Eat
Catfish	Dioxins	Any	Limited
Freshwater Drum	Mercury	Any	1
Lake Trout	PCBs and dioxins	Under 20 inches	1[2x]
Lake Trout	PCBs	20 to 24 inches	6 per Year[2x]
Lake Trout	PCBs	Over 24 inches	Limited
Walleye	Dioxins	Any	6 per Year[2x]
White (Silver) Bass	PCBs and dioxins	Any	Do Not Eat
Yellow Perch	Dioxins	Any	2[2x]
All Other Species	PCBs and dioxins	Any	6 per Year[2x]

Notes:

2x: Remove the fat; double the MI serving amount. PCBs and dioxins are in the fat of the fish. If you trim away the fat and/or cook the fish on a grill or broiling pan so fat can drip away, you can double the number of MI servings.

"Limited": If you are under the age of 15, have health problems, are planning on having children in the next several years, are pregnant, or are breastfeeding, The MDHHS suggests you avoid eating fish listed as "Limited." If NONE of those apply to you, it is usually OK to eat fish listed as "Limited" 1 to 2 times each year.

PCB: Polychlorinated Biphenyl

Saginaw River Fish Guidelines

Type of Fish	Chemical(s) of Concern	Size of Fish (length in inches)	MI Servings per Month
Bluegill	PFOS	Any	4
Carp	PCBs and dioxins	Any	Do Not Eat
Catfish	Dioxins	Any	Do Not Eat
Largemouth Bass	PFOS	Any	6 per year
Smallmouth Bass	PFOS	Any	6 per year
Sunfish	PFOS	Any	4
Walleye	Dioxins	Any	6 per Year[2x]
White (Silver) Bass	PCBs and dioxins	Any	Do Not Eat
Yellow Perch	Dioxins	Any	2[2x]
All Other Species	PCBs and dioxins	Any	6 per Year[2x]

Notes:

2x: Remove the fat; double the MI serving amount. PCBs and dioxins are in the fat of the fish. If you trim away the fat and/or cook the fish on a grill or broiling pan so fat can drip away, you can double the number of MI servings.

"Limited": If you are under the age of 15, have health problems, are planning on having children in the next several years, are pregnant, or are breastfeeding, the MDHHS suggests you avoid eating fish listed as "Limited." If NONE of those apply to you, it is usually OK to eat fish listed as "Limited" 1 to 2 times each year.

PCB: Polychlorinated Biphenyl

PFOS: Perfluorooctane sulfonic Acid (one of a group of related chemicals known as perfluorinated alkylated substances, or PFAS)

Tittabawassee River Fish Guidelines

Type of Fish	Chemical(s) of Concern	Size of Fish (length in inches)	MI Servings per Month
Carp	PCBs and dioxins	Any	Do Not Eat
Catfish	Dioxins	Any	Do Not Eat
Largemouth Bass	PCBs and dioxins	Under 18 inches	6 per Year[2x]
Largemouth Bass	PCBs and dioxins	Over 18 inches	Limited
Smallmouth Bass	PCBs and dioxins	Under 18 inches	6 per Year[2x]
Smallmouth Bass	PCBs and dioxins	Over 18 inches	Limited
Suckers	PCBs	Any	6 per Year[2x]
Walleye	Dioxins	Any	6 per Year[2x]
White (Silver) Bass	PCBs and dioxins	Any	Do Not Eat
Yellow Perch	Dioxins	Any	2[2x]
All Other Species	PCBs and dioxins	Any	6 per Year[2x]

Notes:

2x: Remove the fat; double the MI serving amount. PCBs and dioxins are in the fat of the fish. If you trim away the fat and/or cook the fish on a grill or broiling pan so fat can drip away, you can double the number of MI servings.

"Limited": If you are under the age of 15, have health problems, are planning on having children in the next several years, are pregnant, or are breastfeeding, The MDHHS suggests you avoid eating fish listed as "Limited." If NONE of those apply to you, it is usually OK to eat fish listed as "Limited" 1 to 2 times each year.

PCB: Polychlorinated Biphenyl

Wild Game

The MDHHS issued consumption guidelines for wild game taken from the floodplain areas around the Saginaw and Tittabawassee Rivers. Dioxins and PCBs are found in and around the Tittabawassee and Saginaw Rivers (south of the Midland area). These chemicals can build up in wild game through their food chain. For any wild game from the Saginaw River and Tittabawassee River floodplains, follow the MDHHS Wild Game Guidelines provided below.

Wild Game Guidelines

for the Saginaw & Tittabawassee Rivers' floodplains and connected areas

Type of Game	Chemicals of Concern	*MI Servings* per Month
Duck (with skin)	Dioxins	6 per year
Duck (without skin)	Dioxins	2
Deer	Dioxins	8
Goose (with or without skin)	Dioxins	4
Rabbit	Dioxins	4
Squirrel	Dioxins	8
Turkey (with skin)	Dioxins	6 per year
Turkey (without skin)	Dioxins	1

My Michigan, *MI Serving* Size

- ☑ 8 ounces = 1/2 pound of meat (large oval, slightly larger than two decks of cards)
- ☑ 4 ounces = 1/4 of pound of meat (small circle; about the size of one deck of cards)
- ☑ 2 ounces = size of half a palm of an adult's hand (rectangle)

How much is *MI Serving*?

Weight of Person	*MI Serving* Size
45 pounds	2 ounces
90 pounds	4 ounces
180 pounds	8 ounces

Weigh Less? For every 20 pounds less than the weight listed in the table, subtract 1 ounce of meat.

For example, a 70 pound child's *MI Serving* size is 3 ounces of meat.
90 pounds - 20 pounds = 70 pounds
4 ounces - 1 ounce = a *MI Serving* size of 3 ounces

Weigh More? For every 20 pounds more than the weight listed in the table, add 1 ounce of meat.

For example, a 110 pound person's *MI Serving* size is 5 ounces of meat.
90 pounds + 20 pounds = 110 pounds
4 ounces + 1 ounce = a *MI Serving* size of 5 ounces

NO ONE should eat any organs - like the liver, heart, brains, or gizzards - from wild game taken from the Saginaw and Tittabawassee River areas.

Are you pregnant? Wild game can still be a healthy meal. Use your pre-pregnancy weight to find your *MI Serving* size. These amounts are safe even if you're pregnant or breastfeeding.

Game Weight Totals

Because dioxins and PCBs do not cause immediate health effects, you can calculate how much wild game is safe to eat based on either monthly or yearly amounts - whichever is preferred.

The Game Weight Totals listed here are for a 180-pound adult on a yearly basis. For a monthly breakdown of *MI Servings*, see above.

Weigh more or less than 180? Customize your serving size, based on your weight, using "How much is *MI Serving*?". These guidelines are safe for children, pregnant women, and people with chronic health conditions to use, just customize the serving size based on their weight.

Type of Game	Yearly Total Amount by Weight (for a 180-pound adult)
Duck (with skin)	48 ounces or 3 pounds (6 MI Servings per Year)
Duck (without skin)	192 ounces or 12 pounds (24 MI Servings per Year)
Deer	768 ounces or 48 pounds (96 MI Servings per Year)
Goose (with or without skin)	384 ounces or 24 pounds (48 MI Servings per Year)
Rabbit	384 ounces or 24 pounds (48 MI Servings per Year)
Squirrel	768 ounces or 48 pounds (96 MI Servings per Year)
Turkey (with skin)	48 ounces or 3 pounds (6 MI Servings per Year)
Turkey (without skin)	96 ounces or 6 pounds (12 MI Servings per Year)

Source : https://www.michigan.gov/mdhhs/_/media/Project/Websites/mdhhs/Folder1/Folder95/Eat_Safe_Wild_Game.pdf?rev_9d42627d6f6f47e0a0f466ba93de2a26&hash_273443AFAEECCD3DFE0E524D6C28E79E

Chicken and Livestock

Chickens can consume dioxins when contacting soil and eating insects from the ground. Goats, sheep, pigs and cows can also be exposed to dioxins through the soil if they are grazing on a contaminated pasture. The dioxins in the soil can end up in the eggs, milk and meat from these animals. Because some areas along the Tittabawassee and Saginaw Rivers have high amounts of dioxins in the soil, raising livestock for food or feed is not recommended.

For more information on raising chicken and livestock, please see the "Chicken and Livestock Know Before you Grow: Midland and Downstream River Areas" brochure at: https://www.michigan.gov/mdhhs/-/media/Project/Websites/mdhhs/Folder3/Folder57/Folder2/Folder157/Folder1/Folder257/2019-05-28_Dioxins_Midland__Downstream_APPROVED_WEB.pdf?rev=9b7ebe24ea5b4eada6bb23c996bbc9e2&hash=5E2FCD13369BC5924174EE4ED693DB87

COMMUNITY INVOLVEMENT

This section highlights EPA's past community involvement activities and summarizes EPA's ongoing community involvement goals, activities and timeline to keep residents and local officials informed and involved.

BY THE NUMBERS

2007-2024

COMMUNITY OUTREACH EVENTS

76 Community Advisory Group Meetings

131 General Outreach Events (Farmers Markets, Fairs, Expos, Educational Events, etc.)

23 Public Meetings

43 Additional Project Outreach Events (Conferences, Special Invitation, Community Groups, Etc.)

COMMUNICATIONS TO THE COMMUNITY

28 Unique Factsheets (including proposed plan)

11 Unique EPA Newsletters

Over **100** emails sent since 2010 to a list of nearly 350 people

In addition to initiating long-term cleanup plans and work, the 2010 Settlement Agreement increased activities to engage the community and involve residents in education about the site. The goals that the EPA wants to achieve through its community involvement activities at this site include:

Community involvement is the process of engaging in dialogue and collaboration with community members. The goal of Superfund community involvement is to advocate and strengthen early and meaningful community participation during Superfund cleanups.

- Seeking input from the affected community throughout the process.
- Utilize local knowledge to ensure better decision-making at the site.
- Provide the community with the facts and tools to participate in a meaningful way throughout the process.
- Incorporate new ideas from the community on how best to engage them in the process.
- Build upon the network of community interests to enhance opportunities for public involvement.

To achieve these goals, the EPA has and will continue to conduct many community involvement activities in the area. This section highlights the activities that have been done and/or will be done at the site.

To meet the needs of the community and respond to information obtained during community meetings, **community advisory group**, or **CAG**, meetings, and the community interview sessions and to meet federal requirements, we have established the following objectives for our community involvement efforts:

- Enlist the support, coordination, and involvement of local officials and community leaders.
- Monitor community interest in the site and respond accordingly.
- Keep the community well informed of ongoing and planned site activities.
- Explain technical site activities and findings in an understandable format for community members.
- Get public input on key decisions.
- Change planned activities, where warranted, based on community input.
- Update the EPA's website regularly and provide useful information on it for the community.
- Update the local officials periodically even if no activities are occurring at the site.
- Hold public meetings, when necessary, within the community to give all residents an opportunity to attend.

Community Involvement Activities

To meet federal requirements and address community concerns and questions described in the Community Interviews section on Page 50, the EPA has conducted (or will conduct) the activities described below. Through these activities, it is the EPA's goal to inform, involve and engage the community during site cleanup decisions and efforts. As the needs of the community change, we will modify the community involvement strategies to address them. The following plan is intended as an opportunity for communication between the community and the EPA to address key concerns and questions raised during discussions and community interviews conducted in July 2009 and April through June 2023.

Outreach Goals and Methods

EPA

an outline of community engagement goals and principles and the methods and timing identified to achieve them

goal | method | timing

PROVIDE
INFORMATION TO THE COMMUNITY THROUGHOUT THE CLEANUP PROCESS

- *Keep the community informed of ongoing and planned activities*
- *Explain what is being done and why in an understandable format*
- *Develop informational materials and messages based on community needs*
- *Be transparent by providing data, being forthright and detailed in communications and openly sharing decisions when possible*

WEBSITE, REPOSITORY	available
DEVELOP CIP	current
MAILING LIST	periodic
FACT SHEETS, INFORMATIONAL BROCHURES, IN THE MOMENT VIDEOS*, NEWS RELEASES, NEWSLETTERS	as needed
SHARE DATA IN REAL TIME, WHEN POSSIBLE	periodic
EMAIL LISTSERV	periodic

meets

PROVIDE & INPUT
goals

SITE TOURS	periodic
PUBLIC MEETINGS	as needed
PARTICIPATE IN LOCAL COMMUNITY GROUP MEETINGS	as identified
PLAN OR PARTICIPATE IN LOCAL OUTREACH/COMMUNITY EVENTS	periodic
CAG MEETINGS	quarterly

ACHIEVE EARLY AND FREQUENT OPPORTUNITIES FOR INPUT

- *Encourage and enable residents to get involved*
- *Listen carefully to community concerns*
- *Respond to community concerns in a constructive, fair and respectful manner*
- *Change planned actions, where warranted, based on community input*

SOLICIT COMMENTS DURING A PUBLIC COMMENT PERIOD, PREPARE AND ISSUE A RESPONSIVENESS SUMMARY	periodic

IDENTIFY
AND SHARE RESOURCES FOR IMPACTED COMMUNITY TO HELP ACHIEVE ALL GOALS

- *Help people understand complex environmental issues*
- *Ensure meaningful involvement in decision-making*
- *Provide tools to maximize understanding and participation*

CAG FACILITATION	quarterly
TECHNICAL RESOURCES	as identified
REDEVELOPMENT RESOURCES	as needed

To meet the needs of the community and to respond to information obtained during discussions and community interviews conducted with residents and other community members and to meet federal requirements, EPA has established the following goals, guiding principles and methods for achieving those goals for our community involvement efforts.

Maintain a Point of Contact and Toll-free Number

Community Involvement Coordinators, or **CICs**, Diane Russell and Amelia Holcomb are the primary liaisons between the EPA and the community. They serve as the point of contact for community members and fields general questions about the site. For technical site issues, she coordinates with the EPA's **Remedial Project Managers**, or **RPMs**, for the site, Colleen Moynihan and Sarah Friedman.

We will include current contact information for the project staff on all written and electronic information and will notify the community of any contact information changes.

Diane Russell is located in the Flint, Michigan, office, Amelia Holcomb is in the Chicago, Illinois, office, Colleen Moynihan is in the Cleveland, Ohio, office and Sarah Friedman is in the Chicago, Illinois, office. Residents can contact the EPA staff as questions or concerns arise instead of waiting for a public meeting or to receive written information. EPA contact information will also be included with any local newspaper advertisements and include the toll-free number in all fact sheets and all other communications with the public.

Objective: To provide contacts for community members to reach out to if questions or concerns arise about the site.

Timing: Contact information provided with site information distributed to the community.

SITE CONTACTS

Diane Russell
Community Involvement Coordinator
989 395 3493
russell.diane@epa.gov

Amelia Holcomb
Community Involvement Coordinator
312 886 6242
holcomb.amelia@epa.gov

Colleen Moynihan
Remedial Project Manager
440 250 1702
moynihan.colleen@epa.gov

Sarah Friedman
Remedial Project Manager
312 886 6707
Friedman.sarah@epa.gov

Region 5 toll free hotline:
800 621 8431 weekdays from 9:00 a.m. to 5:30 p.m.

Location of the EPA Community Information Office in Flint, Michigan.

Local EPA Information Office

The cleanup of the site falls under jurisdiction of the EPA's Region 5 office in Chicago. In 2010, the EPA established the Saginaw Community Information Office to carry out many elements of the 2010 CIP. In 2017, the EPA moved this office to an office on Kettering University's campus in Flint to provide wider support to communities in addition to continuing site-specific engagement. The EPA's Community Information Office is located at 1300 Bluff Street, Suite 105 in Flint, Michigan.

Objective: To provide support to communities surrounding the site and to continue site-specific engagement.

Timing: Office is by appointment only; please call 989-395-3493 to schedule an appointment.

Share Information on the Internet

site information, including the site status, background, cleanup activities, and additional site documentation can be found at www.epa.gov/superfund/tittabawassee-river.

Objective: To provide key resources for searching and listing both general and specific information about the site.

Timing: The website will be updated as events occur.

During the 2023 interviews, three Saginaw community members said they did not use the internet to get information, so their suggestion was to continue to mail information to area residents and officials. Three people in Thomas Township mentioned they use social media to get information. People in Bay City did not mention the internet as their main source of information.

Maintain Information Repositories and an Administrative Record

All site related documents are available online at: www.epa.gov/superfund/tittabawassee-river under the site Documents & Data tab on the left side of the screen. Specific documents can be found by searching the title or document ID as identified in the **administrative record** (found under the site Documents & Data tab).

Local **information repositories** for the site have been established at the following locations, also listed in Appendix D:

Grace A. Dow Memorial Library
1710 W St. Andrews Road
Midland, Michigan 48640

Hoyt Public Library
505 Janes Avenue
Saginaw, Michigan 48607

Alice and Jack Wirt Public Library
500 Center Avenue
Bay City, Michigan 48708

The official **information repository** is located at:

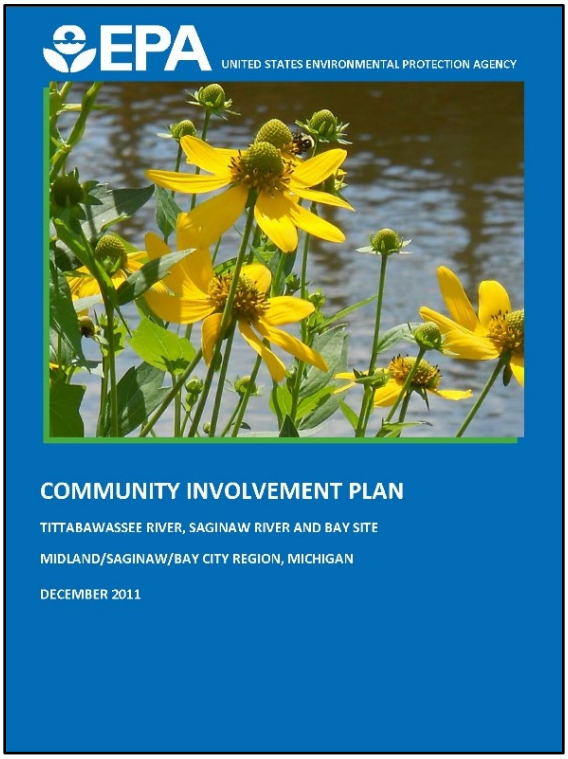
EPA Region 5 Superfund Records Center
Room 711, 7th Floor
Ralph Metcalfe Federal Building
77 W Jackson Boulevard
Chicago, Illinois 60604

Objective: The repository is a collection of site information available online to the public for reading and printing. Documents include fact sheets, technical reports, the CIP and general Superfund information. The EPA adds new documents about the site to the webpage as they become available.

A copy of the administrative record for the site can be found online at the site's webpage. We will update the administrative record as necessary. The administrative record gives residents a paper trail of all documents the EPA relied on, or considered, to reach decisions about the site cleanup.

Timing: Updated with documents as they are made available.

Community Interviews



In July 2009, the EPA spoke with Bay, Midland and Saginaw County residents and local officials during community interviews. During these interviews, residents discussed concerns about the site investigation, cleanup costs, contamination, health, relocation and cleanup. Interviewees also had questions on exposure to contaminants, health risks, dioxins, and long-term cleanup strategies. To read the full summary of the 2009 community interviews, please see the 2010 CIP located on the site Documents & Data page on the site's webpage: www.epa.gov/superfund/tittabawassee-river.

From April 9 through June 9, 2023, the EPA spoke with 15 Bay, Midland and Saginaw County residents and local officials during community interviews. During these interviews, residents discussed concerns about river cleanup, individual property cleanup, impact of contamination, site education, flooding, and site contaminants. A summary of the 2023 community interviews is provided in the Community Interviews section on Page 50.

Objective: To identify and address community needs, issues or concerns.

Timing: When the CIP update is needed.

Update the Site Mailing List

A mailing list of local community members, organizations, businesses and officials has been created for the site. This list will be used for mailing fact sheets, site updates, invitations to public meetings and events and other site-related information. The EPA will update the list regularly to reflect address changes and changes in elected officials, as well as add new people interested in site activities. The mailing list is a way to ensure that those who do not have access to the internet or other information sources still have a way to receive information directly about the site and are notified about important meetings. The mailing list for the EPA use only and is not shared with outside entities. If a community member is interested in being placed on the mailing list, please contact Diane Russell.

Objective: To facilitate the distribution of site-specific information to everyone who needs or wants to be kept informed about the site.

Timing: Reviewed and revised periodically.

During the 2023 interviews, 3 Saginaw interviewees, 12 Thomas Township interviewees and 6 Bay City interviewees said they were on the site mailing list and preferred to receive the mailings over emails. Most said they did not use email or the computer. People provided the EPA with a few local organizations and active community members to add to the mail and email distribution lists.

Update the Site Listserv

The EPA's "Dow-dioxin" **listserv** is a free, subscription-based electronic news distribution system used by the EPA to distribute updates, notifications and progress reports by email and is the fastest way to get the latest information. The listserv cannot be used to transmit graphics and photos. All information conveyed by the Listserv is text-only. There are currently 372 subscribers on the Listserv. The Listserv is for EPA use only and are not shared with outside entities.

Objective: The "Dow-dioxin" Listserv can be used to send instant notice of news releases, meeting notices and other timely information. To receive information by email on an as-issued basis, please visit:

www.lists.epa.gov/read/all_forums/subscribe?name=dow_dioxin

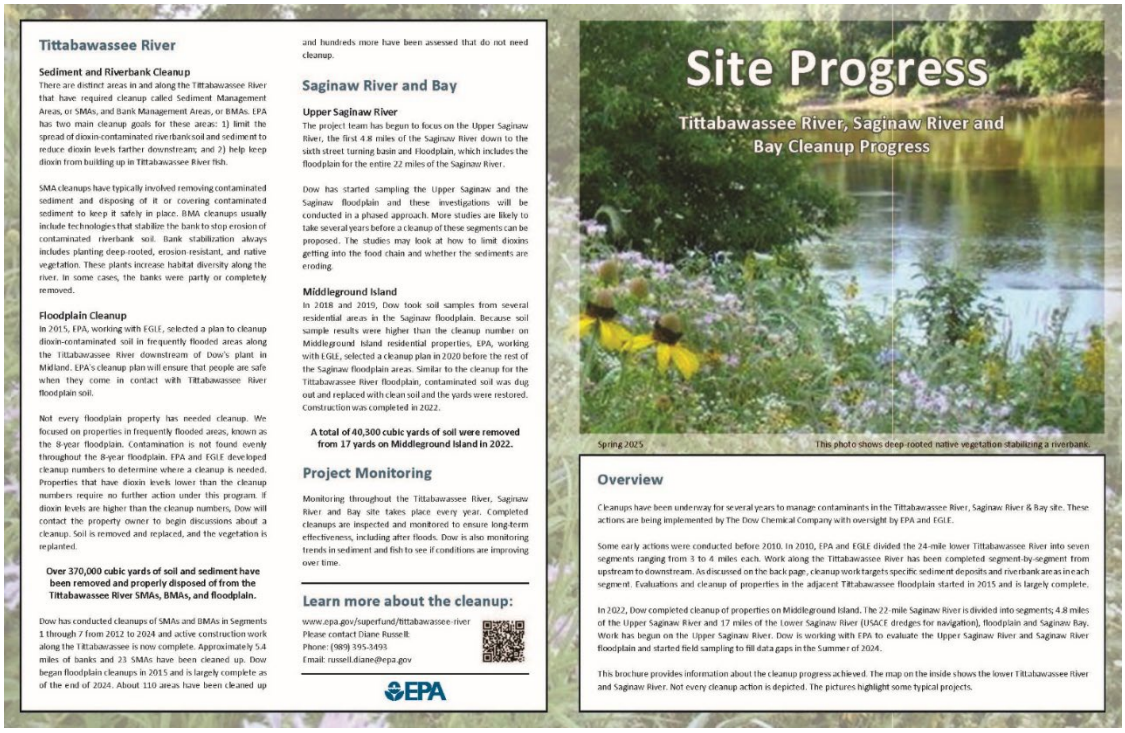
Timing: Updated when needed.

Prepare and Distribute Fact Sheets, Frequently Asked Questions and Site Updates

The EPA has written fact sheets and site updates in non-technical language to coincide with site milestones. Since 2008, the EPA has created and distributed 28 unique factsheets about the site. During the 2023 community interviews, people said the EPA should continue to mail the fact sheets to the mailing list because most people still get the information that way.

The EPA has also created an ongoing Frequently Asked Questions, or FAQ, document for the site. The FAQs are organized by topics, such as health, cleanup methods, fishing, flooding, contamination and drinking water. Since 2010, the EPA has created three versions of the FAQ document; the most recent was updated in February 2024.

These fact sheets and other communications will be posted on the EPA's website and be printed and distributed to locations in the community. The most recent communications to the community can be found in Appendix E.



Tittabawassee River

Sediment and Riverbank Cleanup

There are distinct areas in and along the Tittabawassee River that have required cleanup called Sediment Management Areas, or SMAs, and Bank Management Areas, or BMAs. EPA has two main cleanup goals for these areas: 1) limit the spread of dioxin-contaminated riverbank soil and sediment to reduce dioxin levels farther downstream; and 2) help keep dioxin from building up in Tittabawassee River fish.

SMA cleanups have typically involved removing contaminated sediment and disposing of it or covering contaminated sediment to keep it safely in place. BMA cleanups usually include technologies that stabilize the bank to stop erosion of contaminated riverbank soil. Bank stabilization always includes planting deep-rooted, erosion-resistant, and native vegetation. These plants increase habitat diversity along the river. In some cases, the banks were partly or completely removed.

Floodplain Cleanup

In 2015, EPA, working with EGLE, selected a plan to cleanup dioxin-contaminated soil in frequently flooded areas along the Tittabawassee River downstream of Dow's plant in Midland. EPA's cleanup plan will ensure that people are safe when they come in contact with Tittabawassee River floodplain soil.

Not every floodplain property has needed cleanup. We focused on properties in frequently flooded areas, known as the 8-year floodplain. Contamination is not found evenly throughout the 8-year floodplain. EPA and EGLE developed cleanup numbers to determine where a cleanup is needed. Properties that have dioxin levels lower than the cleanup numbers require no further action under this program. If dioxin levels are higher than the cleanup numbers, Dow will contact the property owner to begin discussions about a cleanup. Soil is removed and replaced, and the vegetation is replanted.

Over 370,000 cubic yards of soil and sediment have been removed and properly disposed of from the Tittabawassee River SMAs, BMAs, and floodplain.

Dow has conducted cleanups of SMAs and BMAs in Segments 1 through 7 from 2012 to 2024 and active construction work along the Tittabawassee is now complete. Approximately 5.4 miles of banks and 23 SMAs have been cleaned up. Dow began floodplain cleanups in 2015 and is largely complete as of the end of 2024. About 110 areas have been cleaned up and hundreds more have been assessed that do not need cleanup.

Saginaw River and Bay

Upper Saginaw River

The project team has begun to focus on the Upper Saginaw River, the first 4.8 miles of the Saginaw River down to the sixth street turning basin and Floodplain, which includes the floodplain for the entire 22 miles of the Saginaw River.

Dow has started sampling the Upper Saginaw and the Saginaw floodplain and these investigations will be conducted in a phased approach. More studies are likely to take several years before a cleanup of these segments can be proposed. The studies may look at how to limit dioxins getting into the food chain and whether the sediments are eroding.

Middleground Island

In 2018 and 2019, Dow took soil samples from several residential areas in the Saginaw floodplain. Because soil sample results were higher than the cleanup number on Middleground Island residential properties, EPA, working with EGLE, selected a cleanup plan in 2020 before the rest of the Saginaw floodplain areas. Similar to the cleanup for the Tittabawassee River floodplain, contaminated soil was dug out and replaced with clean soil and the yards were restored. Construction was completed in 2022.

A total of 40,300 cubic yards of soil were removed from 17 yards on Middleground Island in 2022.

Project Monitoring

Monitoring throughout the Tittabawassee River, Saginaw River and Bay site takes place every year. Completed cleanups are inspected and monitored to ensure long-term effectiveness, including after floods. Dow is also monitoring trends in sediment and fish to see if conditions are improving over time.

Learn more about the cleanup:

www.epa.gov/superfund/tittabawassee-river
Please contact Diane Russell:
Phone: (989) 395-3493
Email: russell.diane@epa.gov

EPA

Site Progress

Tittabawassee River, Saginaw River and Bay Cleanup Progress

Spring 2025

This photo shows deep-rooted native vegetation stabilizing a riverbank.

Overview

Cleanups have been underway for several years to manage contaminants in the Tittabawassee River, Saginaw River & Bay site. These actions are being implemented by The Dow Chemical Company with oversight by EPA and EGLE.

Some early actions were conducted before 2010. In 2010, EPA and EGLE divided the 24-mile lower Tittabawassee River into seven segments ranging from 3 to 4 miles each. Work along the Tittabawassee River has been completed segment-by-segment from upstream to downstream. As discussed on the back page, cleanup work targets specific sediment deposits and riverbank areas in each segment. Evaluations and cleanup of properties in the adjacent Tittabawassee floodplain started in 2015 and is largely complete.

In 2022, Dow completed cleanup of properties on Middleground Island. The 22-mile Saginaw River is divided into segments; 4.8 miles of the Upper Saginaw River and 17 miles of the Lower Saginaw River (USACE dredges for navigation), floodplain and Saginaw Bay. Work has begun on the Upper Saginaw River. Dow is working with EPA to evaluate the Upper Saginaw River and Saginaw River floodplain and started field sampling to fill data gaps in the Summer of 2024.

This brochure provides information about the cleanup progress achieved. The map on the inside shows the lower Tittabawassee River and Saginaw River. Not every cleanup action is depicted. The pictures highlight some typical projects.

Fact sheets, FAQ documents and other outreach material can be viewed at home on the site's webpage www.epa.gov/superfund/tittabawassee-river from the *site Documents & Data* tab.

Objective: To provide community members with current, accurate, easy-to-read and easy-to-understand information about the site.

Timing: Factsheets and site updates will be provided as needed as site cleanup efforts progress.

Prepare and Distribute Newsletters

As work moves forward, it is helpful to see how work progresses and what cleanups have been completed and what work is anticipated. The EPA created the "Our Rivers Today" newsletter in 2011. The newsletter explains the cleanup plan, shares project updates, highlights a project and maintains a calendar of the EPA outreach activities. Since 2011, the EPA has created and distributed 11 unique newsletters about the site.

Newsletters can be viewed at home on the site's webpage from the *site Documents & Data* tab: www.epa.gov/superfund/tittabawassee-river.

Objective: To provide a brief overview and articulate progress in a readable and colorful format.

Timing: The newsletter will be published on an as-needed, ongoing basis.

EPA United States Environmental Protection Agency

OUR RIVERS TODAY

Update on the Tittabawassee River, Saginaw River & Bay Cleanup Project

Spring 2017 Volume 6, No. 1

Segment 3 Cleanup Complete; Preparing for Segments 4 & 5

Cleanup of Segment 3 of the Tittabawassee River started and was completed in 2016. Segment 3 is a four-mile stretch of the river starting about seven miles below where the Chippewa River meets the Tittabawassee River, downstream of the Dow Chemical Co. plant in Midland. There are distinct areas in Segment 3 that were cleaned up, called Sediment Management Areas, or SMAs, and Bank Management Areas, or BMAs.

The Segment 3 cleanup included stabilization of about 1.2 miles of eroding BMAs. Many different

Segment 3 cleanup activities including stabilizing banks, floodplain soil removal and preparation work to remove sediment.

1

Create In-the-Moment Videos

The EPA will develop short videos on site-related topics that can inform the community about the work as well as see it in action. Using video to communicate allows the EPA to reach community members who use video to learn more about the site.

Objective: To provide a brief overview and articulate the progress or other topics in a video format.

Timing: the EPA will work with site teams to determine the appropriate timing of these materials as work continues.

Write and Distribute News Releases and Public Notices

The EPA has released announcements to local newspapers, such as the *Saginaw News* and *Bay City Times*; and local television and radio stations to provide information about events, such as public meetings, **public comment periods** and completion of major milestones, such as the proposal of a cleanup plan. Since 2009, the EPA has released five news releases about the site to local newspapers. The EPA will also continue to provide this information to the city officials for posting on the city website as well as publishing in any community newsletters and social media platforms.

News releases and public notices can be viewed at home on the site's webpage www.epa.gov/superfund/tittabawassee-river from the *site Documents & Data* tab.

Objective: To provide the latest news and information to local media outlets to quickly reach large audiences.

Timing: the EPA typically publishes news releases and public notices to announce major events, such as comment periods, public meetings and major milestones. This will be used as needed.


BAY CITY

Fingerprint, limp led police to arrest teen accused of threats

Surveillance camera footage shows the suspect posting a note on Central High's door.

Cole Waterman

Bay City Central High School, 1624 Columbus Ave., was the subject of two school shooting threats in late March. A teen student is accused of leaving threatening notes on a school door. MLive.com file

Note taped to Bay City Central High School's door on March 27.

EPA

EPA Would Like to Hear from You Tittabawassee River, Saginaw River & Bay Site

U.S. Environmental Protection Agency is interested in talking with area residents about the Tittabawassee River, Saginaw River & Bay site in the Midland/Saginaw/Bay City region. EPA-selected cleanups have been underway for several years, with Dow Chemical conducting the work under EPA oversight. As work continues, it is important to have an up-to-date community engagement plan--a document that lists ways EPA can keep residents, businesses, and local officials informed and involved.

An important step to that update is hearing directly from residents who may have information, questions or concerns, as work continues upstream to downstream from Midland, along the Tittabawassee River and into Saginaw River.

Following are three different dates and locations where you can schedule a 30-minute interview during daytime or evening hours.

Saginaw Library
505 Janes Ave.
Saginaw
Dates: May 9 – 11

Thomas Township Library
8207 Shields Dr.
Saginaw
Dates: May 23 – 25

Bay City Library
500 Center Ave.
Bay City
Dates: June 5 – 7

Please contact U.S. EPA contractor Meg Moore at 440-688-4006 or meg.moore@tetratech.com to schedule a date and time.

If you have any questions, please contact Diane Russell, EPA's Community Involvement Coordinator, at 989-395-3493, weekdays 9:30 a.m. - 5:30 p.m., or at russell.diane@epa.gov.

For additional information visit: www.epa.gov/superfund/tittabawassee-river

During the 2023 interviews, one person recommended the EPA send its news releases to the *Saginaw News* and the *Frankenmuth News.* This individual also suggested the EPA send news releases to the Thomas Township quarterly newsletter (Thomas Township Today), which publishes quarterly. Another resident suggested the Swan Valley Neighbor Magazine. One resident said the M-Live newspaper is day-old news and there is no opinion page; he said there is Midland News and there are very few reporters.

Most people interviewed in 2023 said they did not use the radio as a local information source. A few people said they get news from television (three in Saginaw said they do not; four in Thomas Township said occasionally; and one in Bay City said he does). People mentioned watching the following stations: TV-5, M-Live, and TV-19 (local PBS).

Hold Public Meetings and Hearings

Since 2007, the EPA has held 23 public meetings, including availability sessions and public hearings. The EPA will use public meetings and open house sessions to exchange information or meet with residents to discuss site activities. A public meeting typically consists of a presentation and a question-and-answer session. Meetings may either be held in person or virtually. An open house is an informal meeting where people can talk to agencies on a one-to-one basis. The EPA will use public hearings as required by regulation where the EPA can hear the public's views and concerns about and the EPA action or proposal. Public hearings are recorded by a professional transcriber and become part of the administrative record. The comments are also posted on the internet.

the EPA will schedule, prepare for and attend all announced meetings. The EPA will provide at least a 2-week notice of the scheduled meeting and will conduct meetings at different times and locations throughout the community to give all residents an opportunity to attend as needed. The CIC and other appropriate the EPA staff will attend. Appendix D lists potential community meeting spaces.

EPA hosts a public meeting about river Segments 6 and 7 in October 2018.

Objective: To update the community about site developments and address questions, concerns, ideas and comments.

Timing: the EPA will hold public meetings, open houses and hearings as appropriate.

Participate in Meetings of Local Community Groups

The EPA may offer speakers to local organizations, business clubs and schools as another means of communicating important information to local residents. These meetings can be an effective, convenient way for the EPA to interact with the community, convey information and solicit questions and input from targeted groups. By attending previously scheduled community meetings, residents are able to participate without having to disrupt or change their schedules.

Objective: To update the community on site developments and address questions, concerns, ideas and comments and to provide the site team with a viable means of learning citizens' concerns and attitudes at locations and times that are convenient.

Timing: As identified.

Plan or Participate in Local and Educational Events

EPA staff attends the Dow High School Earth Expo event on April 27, 2024.

Since 2007, the EPA has hosted or participated in multiple outreach events, including attending farmers markets, fairs/expos, festivals, educational events and group presentations for the site. The EPA will participate in local events during which staff can meet with community members to discuss the site. The EPA will also address school faculty and students through visits and presentations to classrooms, faculty, school assembly or other meetings or events. Community events that the EPA may organize or participate in include fairs, festivals, expos, school visits and educational presentations. The EPA will identify local events where it would be appropriate to set up a booth with information about the site and cleanup. These events are also an opportunity to put a public face on those involved in the work being conducted in the community.

Objective: To update the community on site developments and address questions, concerns, ideas and comments and to build relationships through participation of events and activities that are important and enjoyed by the community.

Timing: the EPA will identify opportunities as resources allow.

Community members at the 2023 interviews suggested that the EPA have a booth at the Saginaw Farmer's Market, which runs from May to October, and the Midland Farmer's Market, which runs from May to November. A Bay City resident working for Michigan State University as a Sea Grant educator suggested the EPA participate in local events, such as the Sturgeon release events in August and September during the 2023 interviews. She said the EPA could have an informational table or a speaker to highlight restoration work on the river. She stated, "It's important to focus community involvement on local partnership opportunities. I will share with the EPA potential partners as they come."

Maintain Contact with State and Local Officials, Community Leaders and Residents through Informal Visits to the Community

The EPA has designated a CIC that lives nearby and has the ability to visit the community more frequently. The EPA site team will continue to maintain contact with the appropriate state and local officials, community leaders and residents to address any issues that may arise during the investigation and cleanup at the site. The EPA site team visits the Rockford area regularly to conduct oversite of work, meet with officials and residents and will continue to do so to keep community members informed about the ongoing and planned site activities. Informal visits provide a forum for the EPA to interact one on one with individuals or small groups and respond directly to questions or concerns.

Objective: To help keep community members informed about the site, while providing the EPA with feedback about site activities and the community's opinions.

Timing: Frequently, not less than monthly.

Solicit Input during Public Comment Periods

The EPA will announce each comment period separately. Announcements will appear in local newspapers and fact sheets and will include information on the duration, how to make comments and where to submit comments, etc.

Objective: To give community members an opportunity to review and comment on key decisions. This provides the community members with meaningful involvement in the process. It also provides the site team with valuable information for use in making decisions.

Timing: As required by regulations.

Provide Facilitation Resources to Help the Community Organize

The EPA has resources to provide professional neutral facilitators and mediators to assist with preventing and reducing conflict associated with their environmental projects. Facilitators can assist communities to organize meetings to have productive discussions and allow for dialogue between agencies, responsible parties and community members in an efficient and effective manner.

Objective: To assist community members and/or CAG members to organize productive meetings, articulate concerns to the agencies and assist with effective participation in the decision-making process.

Timing: Ongoing.

Provide Technical Resources

The Settlement Agreement provided funding for the community to obtain technical assistance. Technical assistance refers to the provision of services focused on increasing community understanding of the science, regulations and policy related to environmental issues and the EPA's actions. In 2010, $50,000 was used to hire an independent technical advisor to help interpret and comment on documents developed under the Settlement Agreement. Since then, Dow has provided ongoing assistance through the **technical assistance plan,** or **TAP**, to provide facilitation support to the Saginaw-Tittabawassee Rivers Contamination CAG. Read more about the CAG and current activities on Page 46.

To support healthy communities and strengthen environmental protection, the EPA works closely with communities to make sure they have the technical help they need. Sometimes, a community may need more help to fully understand local environmental issues and participate in decision-making. The EPA provides additional assistance to communities through a variety of technical assistance resources and tools. These resources include:

Technical Assistance Needs Assessment, or **TANA**, Tool: This process identifies additional support that a community may require to understand technical information and participate meaningfully in the Superfund decision-making process. A **TANA** helps the EPA determine what technical assistance resources and information the Agency can provide to meet community needs. For more information, visit: https://www.epa.gov/superfund/technical-assistance-needs-assessments-tanas.

TASC Program: This program provides services through a national EPA contract. Under the contract, a contractor provides scientists, engineers and other professionals to review and explain information to

communities. TASC services are determined on a project-specific basis and provided at no cost to communities. For more information, visit: https://www.epa.gov/superfund/technical-assistance-services-communities-tasc-program.

Technical Assistance Grant, or **TAG** Program: TAGs are awarded to non-profit incorporated community groups. With TAG funding, community groups can contract with independent technical advisors to interpret and help the community understand technical information about their site. The TAG recipient group is responsible for managing their grant funds and contributing a 20 percent award match. Most groups meet this requirement through in-kind contributions such as volunteer hours toward grant-related activities. For more information, visit: https://www.epa.gov/superfund/technical-assistance-grant-tag-program.

TAP: A TAP is funded by potentially responsible parties through provisions in a negotiated settlement agreement. A TAP enables community groups to retain the services of an independent technical advisor and to provide resources for a community group to help other community members learn about site decisions. For more information, visit: https://www.epa.gov/superfund/technical-assistance-plan-tap

Objective: To provide resources and tools to assist the community in understanding local environmental issues and to maximize public participation in decision-making.

Timing: the EPA will work with the community to find the most appropriate resources when warranted.

Community Advisory Group Meetings

In 2009, the EPA hired an independent neutral facilitator to develop a plan for a CAG and facilitate meetings. A facilitator is a contractor who does not report directly to the EPA. First, six local leaders agreed to serve on a CAG steering committee to select CAG members. Interested area stakeholders were then encouraged to apply for membership to the CAG. Steering committee members reviewed the applications and recommended members for the CAG. The Saginaw-Tittabawassee Rivers Contamination CAG has 15 members and has been operating since 2009. Since 2009, 76 CAG meetings have been held.

The CAG touring the Thomas Township Work Area near Bank Management Area 6.

Objective: The CAG is a way for members of communities and stakeholders along the site to present and discuss their needs and concerns related to site cleanup decision-making process. It offers the EPA an opportunity to hear and consider community comments on the design and impacts of the selected

cleanup. A CAG is intended to be a forum through which a broad and diverse sample of community needs and interests are represented.

The presence of a CAG at an SAA site can greatly enhance the community involvement process and an active CAG can help improve communication between community members. The CAG for the site is designed to:

- Promote broad, balanced representation of communities and stakeholders along the entire site.
- Encourage routine and consistent communications and coordination between the EPA and the community.
- Find recommendations about ways to enhance community involvement.
- Give an avenue to the community to voice its needs and concerns.
- Be a consistent source of feedback for the EPA to gauge interests and needs.

Timing: the EPA will work with the Saginaw-Tittabawassee Rivers Contamination CAG on an ongoing basis to assist with meetings and attend meetings as needed. Meetings are held quarterly.

Provide Redevelopment Resources

The EPA works with local government, community organizations, businesses, residents and partners to consider the reuse of Superfund sites in the cleanup process. Involving partners in the cleanup process leads to:

- Establishing productive partnerships with clear goals.
- Protecting the remedy.
- Promoting long-term stewardship.
- Creating awareness about opportunities for site reuse.
- Leveraging cleanup dollars.

The Superfund Redevelopment Initiative (SRI) is a program that can provide guidance, tools and services to help communities overcome obstacles to use at Superfund sites.

Objective: To work with community and site teams to develop a reuse plan to return sites to productive use.

Timing: the EPA will work closely with the site teams and the community to identify if and when this resource may be utilized.

Evaluate and Adjust Community Involvement and Outreach Efforts

The EPA will keep track of outreach and community engagement activities. The EPA may revise its community outreach methods, approaches, and implement additional activities not mentioned in this CIP, based on feedback from residents and local officials.

Objective: To assess the effectiveness of community engagement and outreach efforts and make changes as necessary.

Timing: the EPA will track activities and update the CIP as needed.

THE COMMUNITY

This section summarizes the EPA community interviews that occurred from April to June 2023 and discusses the history and demographics of Bay, Midland, and Saginaw Counties.

Source: https://www.facebook.com/downtownbaycity/

Source: https://www.cloudgehshan.com/projects/midland michigan/

The Tittabawassee and Saginaw rivers and Saginaw Bay have three counties situated on them: Bay, Midland and Saginaw counties. Saginaw was founded in 1835 and is the largest in land area (809 square miles) and population (190,124). Bay County, founded in 1857, is the second largest in land area (631 square miles) and population (103,856). Midland County is the oldest, founded in 1831, and is the smallest in land area (528 square miles) and population (83,494). All three have seen declining populations during the last decade (statistics are based on the 2020 U.S. Census). Each county has numerous independent municipalities.

Tittabawassee River, Saginaw River and Bay site County Government Entities			
Type of Municipality	**Bay County**	**Midland County**	**Saginaw County**
City	Auburn Bay City Essexville Pinconning	Coleman Midland	Frankenmuth Saginaw Zilwaukee
Charter Township	Bangor Monitor	-	-
Township	Beaver Frankenlust Fraser Garfield Gibson Hampton Kawkawlin Merritt Mt. Forest Pinconning Portsmouth Williams	Edenville Geneva Greendale Homer Hope Ingersoll Jasper Jerome Larkin Lee Lincoln Midland Mills Mt. Haley Porter Warren	Albee Birch Run Blumfield Brady Brant Bridgeport Buena Vista Carrollton Chapin Chesaning Frankenmuth Fremont James Jonesfield Kochville Lakefield Maple Grove Marion Richland Saginaw Spaulding St. Charles Swan Creek Taymouth Thomas Tittabawassee Zilwaukee
Unincorporated	Linwood Munger	-	-
Village	-	Sanford	Birch Run Chesaning Merrill Oakley Reese St. Charles

Community Interviews

To prepare for the community interviews, EPA mailed out a postcard to community members listed on a site mailing list comprised of residents and businesses from the communities along the rivers and bay and local, state and federal officials. During the interviews, community members were asked to recommend other community members whom EPA should interview. EPA reached out to these people.

Between April 9 and June 9, 2023, CIC Diane Russell spoke with 15 residents who live along the Tittabawassee River, two who live along the Saginaw River, one who lives on Middle Ground Island, and one who lives on Saginaw Bay. EPA also spoke with one resident who is a member of a local environmental organization, one who works at the Thomas Township Nature Center and Preserve, and one who works as a Michigan Sea Grant Educator out of Michigan State University. All 22 were homeowners. Three of the interviewees were members of the CAG. Most interviews were done in person, with one done in a virtual setting. All the interviewees spoke English as their first language.

During the interviews, the interviewees educated EPA on their community and told us about their concerns. The concerns provided in writing by one resident are also incorporated. A summary of what we heard is below. Appendix C includes the list of questions used to guide the interviews.

Note: This summary on pages 50 through 58 intends to faithfully record and reflect the issues and concerns expressed to EPA by residents and officials interviewed during our community interviews. By necessity, this is a collection and summary of thoughts and observations, and, in some cases, opinions. Please be cautioned that the statements contained in this section may or may not be factual and that the opinions/concerns expressed may or may not be valid.

The concerns and questions interviewees voiced during the community interviews are detailed in this section. Below is a list of topics under which these concerns and questions are categorized.

1. Communication and informational needs
2. Education
3. Work done on property
4. Contamination on property
5. Flooding
6. Remediation and Restoration
7. Wildlife impacts
8. Health

This Word Cloud shows the most common concerns interviewees had during the community interviews. The following subsections detail the concerns and comments EPA heard.

Communication and Informational Needs

When asked where people get their information about the site from, the following were the most mentioned resources.

EPA Mailings

The people EPA talked to in Saginaw (3 people), Thomas Township (12 people), and Bay City (6 people) said they were on the site mailing list and preferred to keep receiving the mailings.

- Fact sheets
- Postcards

All interviewees asked said they heard about the interview process from the mailing.

Newspapers

- Saginaw News
- Frankenmuth News
- Thomas Township Today Newsletter
- Swan Valley Neighbor Magazine
- M-Live
- Midland News

One resident said the M-Live newspaper is day-old news and there is no opinion page

Local Events

Occasionally, the city, local agencies, or community groups will request EPA's participation in events to provide information about the site and respond to resident concerns

- Saginaw Farmer's Market (May to October)
- Midland Farmer's Market (May to November)
- Sturgeon release events (August and September)

Local News Channels

A few people said they get their news from television (all 3 in Saginaw said they do not; four in Thomas Township said occasionally; and one in Bay City said they do).

- TV-5
- M-Live
- TV-19 (local PBS)

Online

Community members EPA spoke with in Saginaw and Bay City said they did not use the internet to get information.

Three people in Thomas Township mentioned they use social media to get information.

Most people asked said they did not use email or the computer.

Comments and questions regarding communication and informational needs EPA heard include the following:

- Use StoryMaps as a tool to highlight work that has been done along the river. One individual said they are a good visual tool, and a QR code could be linked to it on fact sheets.
- Use videos as an educational tool. One person stated, "Having something digital that can be easily updated and is accessible is important to outreach."

- Engage local township and city officials in community outreach activities. One individual specifically told EPA that the officials in Zilwaukee had changed.
- Add an educational component about the Tittabawassee cleanup to the Nature Center. The Thomas Township Nature Center and Preserve coordinator said they would inquire about adding educational signage around the preserve.

> *"I think EPA does a very important job for the average U.S. citizen. EPA needs a better story about what their successful projects are, and this is one of them."*
>
> - Local resident

- Convey the cleanup story of the site as a successful one.
- Continue to keep the communities up to date on the cleanup progress of the site. "I appreciate EPA taking the time to have these conversations with the community."
- "Did you share information before these interviews at community spaces as a way to get information out?"

Site Education

One resident and member of the CAG said he thought the cleanup was going well but said not everyone knows the full story: "We can try to educate people, but we can't force people to learn." Another CAG member said it is important when talking to people to translate the science to something that would be easier for people to understand. A third resident and member of the CAG wanted to ensure there was adequate signage around educating people on the river cleanup and advisories.

> *"The story is changing to one of success. I would like to see the story told with data to show how things have improved."*
>
> - Local resident and CAG member

One Bay City resident who works for Michigan State University as a Sea Grant educator said she would love to be a resource to EPA to help educate residents on the river cleanup. She said she can disseminate information in her task force meetings and community events and let EPA know when community events are occurring so EPA can connect with residents. She said, "Please keep me informed in the future – I am happy to help wherever I can. I am very interested and can help EPA connect with other partners."

One resident educated EPA on the practices and conditions of the Dow plant back in the day. This resident's great-grandfather had worked for Dow and said it was not a good place to work. He said Dow was dumping waste materials before regulations, and the working conditions were bad.

Other comments and questions EPA heard about site education include:

- "None of this information is helpful. We would like to know if we are any better than we were originally."
- "I knew exactly what I was going hear when I came in here."
- "It is hard to get people in the room – it is not that people don't care; it is just hard to get people to come when a bunch of other things are going on."
- "What is the purpose of you coming here today?"
- "What have other people been concerned about?"
- "Are things improving?"

- "Can you give a definition of riparian rights?"
- "Is there going to be a report including the responses from the interview sessions?"
- "Why was there so much 'ruckus' 20 years ago and not so much now?"

Work Done on Property

One woman told EPA she was very happy with the work that had been done on her property. She said she had no problems and appreciated what had been done. She specifically talked about the new trees, a sprinkler system and cement walkways that were installed. She said that the work her husband had done on the property was undone and not restored to how he had done it, but was still grateful for the work. Two residents stated stones were put in on their property near the river as a fishing pad, but those were long gone because of flooding. They said, "[Dow] came along and put stuff on our bank and planted plants; I feel like that is not going to stop the water flooding to the hill in our backyard, bringing the contamination. I wouldn't mind someone coming and testing the soil." Another person said that the bank on their property is eroding quickly and wondered if there was a way to save it.

A few people wondered what will be done to their properties – many said their banks were eroding quickly. One resident said remedies were washing downstream onto his property – he had black grid textile, trash bags of mulch, and other geotextile fabric wash up on his banks. One resident and member of the CAG said he thinks people want to know if tests are being done to see if there are actual results from the remedies.

One woman was upset with the work done on her property and said it was not what she thought it would be. She said there was a lack of communication between her and the site workers, and she says her property floods more often and her gardens are gone. She requested her landscaping be fixed so she could move back into her home full-time. She said, "I was naive to trust that my yard would be restored while I was away. I feel like the team deceived me." Another person felt not enough was done to clean up individuals' properties: "I feel expendable – I think individuals have been expendable throughout this process. I see parks and public land cleaned up annually."

One resident said he knew neighbors on Middle Ground Island who were thrilled with what was done to restore their land. He said they were very impressed that the team listened to what they wanted and kept up with the restoration.

Contamination on Property

One resident said a natural lake on his property is no longer there because of cleanup activities along the river and his property. The lake, previously known as Cavanaugh Lake, is now a drainage ditch known as Reineke Drain. This resident said they were not informed of what they did with the lake when the ditch was put in. He also said a lot of wildlife used the lake around 35 years ago but died quickly. He said, "In the name of progress, the lake had to go." One resident said she feels bad for her neighbors who have little kids who were never told about the contamination. That same resident said upriver from them, they [Dow] dug up a hotspot [area of high contamination], but that doesn't solve the contamination issue. She said, "I don't understand how we don't have direct exposure. I assume dioxins are all over my yard. We feel robbed. Dow came along and said you aren't using this, so we are done with you. We were hoping to build trails, hunt, fish, etc."

A few other people also talked about dioxin contamination on their properties. One person said she heard from someone who was supposed to be an "expert" on dioxins that it was best not to disturb them. A few

residents expressed concerns about hotspots being found on their properties during initial testing. They all wondered why their yards were not part of the cleanup.

One interviewee expressed concern about the quality of his well water and wanted to know what was in his water. He asked EPA where he could go to get his water tested and if Dow would pay for the testing, as the water at his property and the property across the street had recently started smelling bad.

One person EPA spoke with expressed concern that dredged sediment had been used for fill around his property. He was concerned that his property could be contaminated.

Other comments and questions EPA heard about contamination on property include:

- "Our dreams and world were crushed – what we thought we had wasn't what we expected."
- "No one has come to our house to ask about monitoring."
- "I feel sickened. Our property isn't what we thought we bought. It is heartbreaking."
- "If Dow came and resampled an area in yards and compared the numbers, that might mean more to people."
- "EPA cares about high-exposure areas to the public, not high-exposure to an individual."
- "Our neighbors have been tapping their maple trees – is the syrup contaminated?"
- "Every time it floods and brings water to the land, does that also bring dioxins into the yard?"
- "How can we get testing done on our property?"
- "The contamination isn't going away out of my yard, right?"
- "Why is my property a confirmed hotspot yet left out of the cleanup?"
- "Are there any grants/help for me to mitigate my yard? Can I clean it up? How can I protect myself?"
- "If the remedy on my property fails, what would happen?"
- "How do we know that dioxin-contaminated sediment isn't on my land/washing up on my property?"
- "Will the banks on our property look like the banks at the park?"
- "Why aren't you doing anything on our bank? Did you omit our place?"
- "Have there been other complaints about land restoration?"
- "What is the purpose of the demarcation in my yard?"
- "Can vegetation/roots penetrate through the demarcation?"
- "How do I clean up the algae blooms near my property?"
- "Is there a concern about fruit and vegetable intake?"
- "My wife and I plan to sell our house someday. I heard some realtors would be trained on how to sell the houses in this area – is that still true?"

Flooding

Several people EPA spoke with talked about the flooding along the rivers. One interviewee said she regularly deals with flooding on her property but accepts that flooding is a consequence of living on the river. Another interviewee said that his property flooded, and in 1986, he got a lot of water in his basement. He said, "If there was any contamination in the river, it would have made it to my house." He expressed concern that his property may be contaminated, and no investigation or cleanup has been done on his property.

Another individual expressed concern about the flooding on his property. He said flooding had "gotten a lot worse" after the Army Corps of Engineers, or USACE, installed the Dredged Material Disposal Area, or DMDF, next to his property. The DMDF was built to handle the dredged sediment from the Sixth Street Turning Basin in the Saginaw River. He said the increase in flooding has made it impossible to farm his land. He said before the DMDF was installed, he did get some flooding, but he was able to keep up with pumping out the flood waters and farm his land. However, after the DMDF was installed and the dredged sediment from the turning basin began being dewatered next to his property, the flooding on his property became far too much for him to pump. Thus, he can no longer farm his 97 acres and has not been compensated for that loss. He said his neighbor had also lost two crops due to the flooding caused by dewatering sediment dredged from the turning basin. He said, "A lot of prime farmland was lost." He said the berm that had been installed between the dewatering area and his property is porous, and the water from the dewatering process is getting onto his property through the groundwater. He said he asked for a liner to be installed to hold back the water, but he was told it was too expensive. He said he was also concerned that the contamination could also be carried to his property through the water. He asked EPA who he could talk to at USACE to find out when the dredging would be done. He said he would also like to talk to USACE about the location of the fill tube. He said he thought USACE underestimated how much dredging would be required.

Three residents said the dams change the flooding for them; since the dams are dry, the flooding is much better. They also said there has been an improvement in the wildlife they see since the dams have been dry. One resident said every year that it floods, he has standing water for months, followed by clouds of dust when it dries out. A couple of other residents mentioned standing water from flooding and asked if anything could be done to drain or eliminate that water.

Other comments and questions EPA heard about flooding include:

- "Do they have the new Federal Emergency Management Agency, or FEMA, maps out?"
- "Do you know anything that is going on with the dams? Are they going to get rebuilt?"
- "Does Dow go back and repair what has been damaged [after heavy flooding]?"
- "Are you familiar with the permitting process in a floodplain?"

Remediation and Restoration

> *"It is good to see the responsible party paying for cleanup."*
>
> - Local resident

One resident, while disappointed about the contamination near his property, said it was good to see the progress on the Tittabawassee River and how "it is nice to see there will be something for the next generation to enjoy." A Bay City resident who works for Michigan State University as a Sea Grant educator said she educates people on the river cleanup when she gets questions. She said she is involved in advisory groups and task force meetings and hosts a variety of community workshops and events – she offered to include EPA in events as a means to reach more residents in the area.

One interviewee talked to EPA about the Saginaw River Headwaters Rec Area that had been built on top of a contaminated area of foundry sand. She said the park is beautiful. Another person asked if the park cleanups were completed.

Other comments and questions EPA heard about remediation and restoration include:

- “I still don’t feel comfortable going by the river.”
- “I think it would be smart for Dow to randomly check areas along the river segments.”
- “This is taking a long time.”
- “It is a mistake that Dow is taking the data [doing the monitoring].”
- “I have never been too concerned about contamination – there is a better chance of drowning in that river.”
- “I think EPA did a good job. Work was straightforward. That’s all people want – truth. I’ve been pretty pleased.”
- “What work are you going to do on the river?”
- “Where are you testing?”
- “How do we know the remedies are working?”
- “Did Dow look further and say now that we’ve stabilized these areas, are there other areas where dioxins are that could eventually erode?”
- “When they talk about yearly monitoring, where are those locations?”
- “How does EPA feel Dow is doing as far as cleanup goes?”
- “Does the location of contamination change year to year?”
- “Is Superfund tax money paying for remediation and cleanup, or is Dow?”
- “Were other contaminants from the Dow plant getting into the river system?”
- “Is the river safe for recreation?”
- “Are PCBs a contaminant of concern?”
- “How far into the Bay does the site encompass?”
- “Is PFAS a contaminant in the river system?”
- “What do you cap sediment with?”
- “What should we do about Phragmites along the riverbank?”
- “Is the algae in the river toxic?”
- “Has there been a lot of monitoring on the Saginaw River?”
- “What do they do with the sediment when it’s filtered out of the drinking water supply? What did they do with the sediment cleaned up from the river?”
- “Across the river, they put in a large culvert with stone around it – is a biking path being built near the river on that side?”
- “How do you explain surface-weighted concentrations/risk assessment to people?”

Tittabawassee River watershed management looking downstream.

Impact of Contamination on Wildlife

One person EPA spoke with expressed concern about the potential impact of the contamination on the deer population. He said he took a photo of a deer that had a large cyst on it. He was concerned that the cyst was caused by the contamination. He said he believed that to be the case because he found a photo of a similar cyst on a deer on the internet, and the person who posted that photo said the cyst was caused by the deer eating plants in contaminated soil. He said he no longer hunts in or eats deer from the area because he was concerned the deer could be contaminated. Another resident said he saw a strange-looking animal in his backyard and still is unable to identify what he saw; he wondered if it was a result of the contamination in the river. Six residents in Thomas Township expressed their unhappiness about the potential contamination of wildlife along the river. They were unhappy they could not hunt or fish, but a couple of residents said at least the wildlife looks good. One interviewee said they were concerned about the fish in the Bay because they see a lot of people eating fish.

"Why is there a fish advisory?"

For more information on the fish advisory and other wildlife guidelines, please refer to the "Saginaw and Bay County Cooperative Agreement" section on page 26 of this CIP.

Health

Two residents said many people around them have died of cancer. Two residents who spoke with EPA were battling cancer. One person asked if it was safe to walk barefoot in the grass. Another interviewee asked, "What happened to the class action lawsuit?"

Describe your Community

When asked to describe their community, people said:

- "Our neighborhood has changed. A lot of young people have moved in. People are more disconnected."
- "New people who do not know about the site are moving in."
- "A lot of the new residents have money."
- "It is a great place to live."
- "Beautiful area."
- "Very peaceful."

Community History

This section describes the histories of Bay, Midland, and Saginaw counties.

Bay County

Bay County is located along Saginaw Bay on the central-eastern border of Michigan's Lower Peninsula.

The Sauk Tribe inhabited the Saginaw River Valley until the late 17th century. Wars between Native Americans wiped out the Sauk Tribe near the present-day Middle Grounds in Bay City and farms in Frankenlust Township.

In 1832, Bay City was settled by Leon Trombley from Detroit and was known as "Lower Saginaw," and fell within the boundaries of Saginaw County until Bay County was organized in 1857. In 1859, Bay City was incorporated as a village, and in 1855, it was a city.

Bay County was established in 1857 from a territory that today makes up Arenac County and parts of Midland and Saginaw counties. In 1883, Bay County acquired its current proportions, including 30 miles of shoreline. Two main rivers, the Kawkawlin and Saginaw Rivers, are in Bay County; the Saginaw River is the largest river in Michigan (https://www.baycounty-mi.gov/AboutBayCounty/HistoryBayCounty.aspx).

The natural geographical configuration of Bay County led to the economic base, which included lumber, coal, salt, sugar beets, potatoes, soybeans, wheat and oats, chemical manufacturing, knitting mills, automotive manufacturing and boat building. In 1844, the lumber industry started in Bay County when a mill was constructed at the mouth of the Kawkawlin River.

Shipyards in Bay County produced Great Lakes steel freighters and other watercraft. During World War II, the shipyards helped produce U.S. Destroyers and missile vessels for the war effort. Today, the county produces hydroplanes, sailboats, catamarans and iceboats (http://www.mifamilyhistory.org/bay/index.htm).

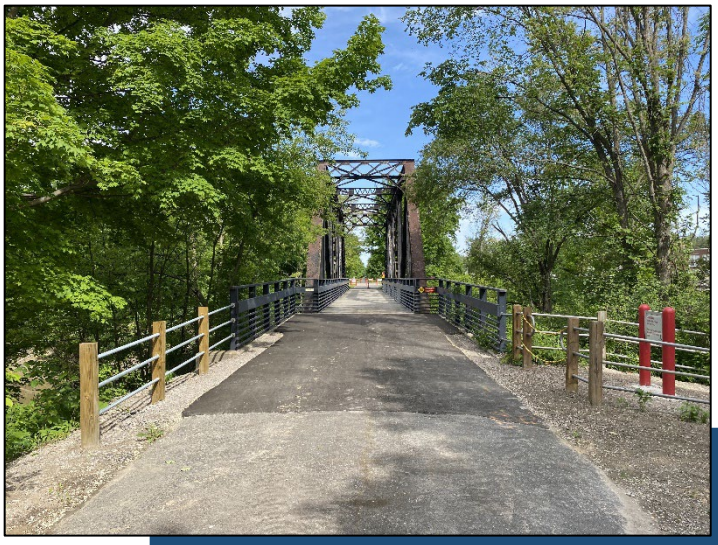
Today, Bay County comprises of 14 townships and 4 cities and is the 20th most populace county in Michigan.

Midland County

Midland County is in the east-central region of Michigan. For many centuries, Midland County was inhabited by Native Americans. By the time Europeans came, the area was inhabited by the Chippewa Indian Tribe.

In 1850, Midland County was organized, and in 1874, the Flint and Pere Marquette Railroad linked Midland to the nationwide railroad network. The county's name is due to its closeness to the geographical Lower Peninsula's geographical center. The City of Midland, the county seat, was incorporated in 1887, and in 1890, Herbert Henry Dow settled in the area and founded the Dow Chemical Corporation in 1897 (https://cityofmidlandmi.gov/551/Midland-History).

In the 20th century, the county experienced significant growth with the growth of the Dow and the establishment of major roads and highways. The historic Midland County Courthouse was constructed in 1924 and is now on the National Register of Historic Places. However, in the late 20th century, the Pere Marquette Railroad was closed, which cut off passenger train travel to the region.



The Pere Marquette Rail Trail occupies a 28 mile abandoned railroad corridor in Midland and Isabella Counties and was once part of the Flint and Perre Marquette Railroad. Source: www.midlandcountymi.gov

In 1917, Dow eliminated the direct discharge of wastewater to the Tittabawassee River and continued to implement additional wastewater treatment practices throughout the next several decades to reduce or eliminate contaminant releases to the river. Ongoing monitoring by the EPA and the EGLE shows contaminant sources to the Tittabawassee River have been effectively controlled. Secondary sources of dioxins and furans to the Saginaw River result from the erosion of contaminant deposits from the Tittabawassee River sediment bed and banks, which are then transported to the Saginaw River (October 2022 Tittabawassee and Saginaw River Team Current Conditions Report).

In World War I, Dow produced poisonous gases for use during the war (https://www.mlive.com/news/bay-city/2014/08/dow_chemical_cos_top-secret_wo.html). In World War II, Dow manufactured explosives, flares, and medicine for the war effort. Dow and Midland County were the main suppliers of Napalm used during the Vietnam War (https://ss.sites.mtu.edu/mhugl/2015/10/11/the-dow-chemical-company-midland-mi/).

Today, Midland County comprises 16 townships, 1 village, and 2 cities.

Saginaw County

Saginaw County is in the east-central region of Michigan. It lies on the Saginaw River (leading to Saginaw Bay in Lake Huron), about 100 miles northwest of Detroit. From 1675 to 1819, the residents of the Saginaw area consisted of the Sauk and Chippewa Indian Tribes and European fur trappers and traders. In 1819, a permanent settlement was established, and the treaty of Saginaw was signed by Lewis Cass, territorial governor of Michigan, and Chiefs and members of the Chippewa, Ottawa, and Potawatomi tribes (https://michiganology.org/stories/a-short-history-of-treaties/). In 1822, Fort Saginaw was established and then abandoned the next year by the military. In 1824 Saginaw territory was organized and then attached to Oakland County for judicial purposes (https://www.saginaw-mi.com/residents/saginaw_history.php).

Saginaw Township (including the entire county and adjacent land) was organized in 1830, and in 1835, Saginaw County was organized as an official county. In 1864, the first bridge was built across the Saginaw River (Genesee Bridge). In the 1870s, lumber production peaked in Saginaw. Waste from the sawmills was used to make salt from brine water. In 1917, the state of Michigan ordered Saginaw to build a sewage

disposal system other than the river. To provide drinking water, Saginaw drilled wells and provided pumps. Residents had to pump and haul drinking water until 1948 (https://www.saginaw-mi.com/residents/saginaw_history.php).

In the 20th century, new industries developed after the lumber era. In the early 1900s, coal mining was a booming industry. Beginning in the mid-1910s, Saginaw's economy was dominated by automotive manufacturing, most notably manual transmission assemblies, steering gearboxes and power steering pumps (https://www.britannica.com/place/Saginaw).

Saginaw County has a vast system of waterways, woodlands, nature preserves, and trails. Today, Saginaw County contains 3 cities, 27 townships and 6 incorporated villages.

The William H. Haithco Recreation Area in Saginaw County. The area includes a beach, volleyball courts, paddleboat, canoe, rowboat, and kayak rentals, fishing access, and a playground. Source: www.saginawcounty.com/departments/parks_recreation/parks_trails/william_h_haithco_recreation_area/

Appendix A

Glossary – Initials – Acronyms

Accelerated Cleanup Activities. Cleanup actions taken at areas with high concentrations of contamination mostly along the Tittabawassee River. Early actions have occurred in areas along the Tittabawassee known as Reach D, Reach J/K, Reach M, Reach MM, Reach O, and Riverside Boulevard, West Michigan Park and at Wickes Park along the Saginaw River.

Administrative Settlement Agreement and Order on Consent. An administrative settlement agreement and order on consent (ASAOC) is an agreement between the EPA and a business or other entity to resolve compliance issues. The agreement requires the violator to pay for damages, take corrective actions, or stop activities that caused the violations. ASAOCs are often used to address environmental damages.

Administrative Record. The body of documents that forms the basis for the selection of a particular response at a site. For example, the administrative record for remedy selection includes all documents that were considered or relied upon to select the remedy through the **record of decision, or ROD**.

ASAOC. See Administrative Order on Consent.

Area of Concern. Geographic areas designated by the U.S.-Canada Great Lakes Water Quality Agreement where significant impairment of beneficial uses has occurred as a result of human activities at the local level. An Area of Concern is a location that has experienced environmental degradation.

Bank Management Area. A wetland, stream, or other aquatic resource area that has been restored, established, enhanced, or (in certain circumstances) preserved for the purpose of providing compensation for unavoidable impacts to aquatic resources.

Beneficial Use Impairment. A change in the chemical, physical or biological integrity of the Great Lakes system that caused significant environmental degradation. All projects within the Great Lakes Basin Area of Concern program are intended to improve environmental health such that these designated impairments can be removed.

BMA. See Bank Management Area.

BUI. See Beneficial Use Impairment.

CAG. See Community Advisory Group.

Capping. A technique that involves placing a cover, called a cap, over contaminated material to isolate and contain contaminants and prevent their spread.

CERCLA. See Comprehensive Environmental Response, Compensation and Liability Act.

CIC. See Community Involvement Coordinator.

CIP. See Community Involvement Plan.

Cleanup. Actions taken to deal with a release or threat of release of a hazardous substance that could affect humans and/or the environment. The term “cleanup” is sometimes used interchangeably with the terms “remedial action,” “remediation,” “removal action,” “response action,” or “corrective action.”

Community Advisory Group. A community advisory group (CAG) is made up of representatives of diverse community interests. A CAG is designed to serve as the focal point for the exchange of information among the local community and the EPA, the State regulatory agency, and other pertinent Federal agencies involved in cleanup of the Superfund site. Its purpose is to provide a public forum for community members to present and discuss their needs and concerns related to the Superfund decision-making process. A CAG can assist the EPA in making better decisions on how to clean up a site. It offers the EPA a unique opportunity to hear-and seriously consider-community preferences for site cleanup and remediation. However, the existence of a CAG does not eliminate the need for the Agency to keep the community informed about plans and decisions throughout the Superfund process. For more information, please visit: www.epa.govsuperfund/superfund-community-advisory-groups.

Community Engagement. The process of involving communities in all phases of the cleanup process. Communities are asked to provide input on how the cleanup will be conducted and how it may affect community plans and goals. See also Community Involvement.

Community Involvement. The term used by the EPA to identify its process for engaging in dialogue and collaboration with communities affected by Superfund site. The EPA's community involvement approach is founded in the belief that people have a right to know what the Agency is doing in their community and to have a say in it. Its purpose is to give people the opportunity to become involved in the Agency's activities and to help shape the decisions that are made.

Community Involvement Coordinator. The EPA official whose lead responsibility is to involve and inform the public about the Superfund process and response actions in accordance with the interactive community involvement requirements set forth in the National Oil and Hazardous Substances Pollution Contingency Plan.

Community Involvement Plan. A plan that outlines specific community involvement activities that occur during the investigation and cleanup at the site. The CIP outlines how the EPA will keep the public informed of work at the site and the ways in which residents can review and comment on decisions that may affect the final actions at the site. The document is available in the site's information repository maintained by the EPA. The CIP may be modified as necessary to respond to changes in community concerns, information needs and activities.

Comprehensive Environmental Response, Compensation, and Liability Act. A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. Commonly known as Superfund, CERCLA is intended to protect people's health and the environment by investigating and cleaning up abandoned or uncontrolled hazardous waste site. Under the program, the EPA can either:

- Pay for site cleanup when parties responsible for the contamination cannot be located or are unwilling or unable to do the work; or
- Take legal action to force parties responsible for site contamination to clean up the site or pay back the federal government for the cost of the cleanup.

Contaminant(s). Any physical, chemical, biological or radiological substance or matter that has an adverse effect on air, water or soil.

Contamination. Introduction into water, air and soil of microorganisms, chemicals, toxic substances, wastes or wastewater in a concentration that makes the medium unfit for its next intended use. Also applies to surfaces of objects, buildings and various household use products.

Dense Non-aqueous Phase Liquid. Dense nonaqueous phase liquids, or DNAPLs, are chemicals or mixtures of chemicals that have two major characteristics in common: they are heavier than water, and they are only slightly soluble in water. These two physical characteristics mean that when released into the environment in sufficient quantity, they can move through soils and groundwater until they encounter a sufficiently resistant layer that will impede further mass vertical movement and allow the liquid to pool.

Dioxin. A group of toxic, persistent organic pollutants that are chemically similar compounds. They are highly toxic and can cause a variety of health problems. Dioxins are found throughout the environment and can accumulate in food chains, particularly in the fatty tissues of animals. The EPA estimates that more than 90 percent of human exposure to dioxins occurs through the consumption of animal fats, such as meat, dairy, fish, and shellfish. Dioxins can also be present in other sources, including drinking water and soil.

Dredging. The removal of sediment (mud) from the bottom of a body of water.

Early Actions. Cleanup actions taken at contaminated areas in and along the Tittabawassee River before a comprehensive cleanup takes place.

EJ. See Environmental Justice.

EU. See Exposure Units.

Emergency Response Action. Responses to hazardous waste releases that threaten the public health, welfare or the environment. Emergency response actions tend to be rapid to address immediate threats.

Emissions. Substances released into the air and are measured by their concentrations, or parts per million, in the atmosphere.

Environmental Justice. The fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development and enforcement of environmental laws, regulations, and policies. Fair treatment implies that no population should be forced to shoulder a disproportionate share of exposure to the negative effects of pollution due to lack of political or economic strength.

Erosion. The natural process of loosening and removing soil and rock material by the action of wind, water, and ice. There are two main types of erosion: geological and man-made. Geological erosion is a natural process that contributes to the formation of soils and their distribution on the earth's surface. Man-made erosion can speed up the natural process and is caused by altering the land through clearing or grading.

Exposure Units. Flood prone properties identified by the EPA and the Michigan Department of Environment, Great Lakes, and Energy, or EGLE along the Tittabawassee and Saginaw rivers that may be frequently used.

Fish Advisory. State-generated health warning regarding the consumption of fish. Fish advisories include advice on how to reduce exposures to chemical contaminants in fish by avoiding or reducing consumption and by the use of filleting/trimming and cooking techniques to further reduce contaminant levels.

Floodplain. A relatively flat lowland area that borders inland and coastal waters. Floodplains are often made of nutrient-rich river sediments and can be flooded by heavy snowmelt or storms. They can also provide temporary storage for floodwaters and sediment from the watershed.

Furan. Furan is also a hazardous substance that is on the Right to Know Hazardous Substance List and the Special Health Hazard Substance List. It is a clear, colorless liquid with a pleasant odor that turns brown

when exposed to air. Furan is used in the production of pharmaceuticals, insecticides, and other chemicals, and as a solvent for resins.

Groundwater. Underground supplies of drinking water.

Hazardous Substance(s). Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive or chemically reactive. Any substance designated by the EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or is otherwise released into the environment.

Hazardous Waste. Byproducts that can pose a substantial or potential hazard to human health or the environment when improperly managed. Hazardous wastes usually possess at least one of four characteristics (ignitability, corrosivity, reactivity or toxicity) or appear on special EPA lists.

High-Use Properties. Flood prone properties along the Tittabawassee and Saginaw rivers that are frequently used by people.

Information Repository. A file containing current information, technical reports and reference documents regarding a site. The information repository usually is located in a public building convenient for local residents such as a public school, town hall or library.

Mitigation. Measures taken to reduce adverse impacts on the environment.

National Priorities List. The EPA's list of serious uncontrolled or abandoned hazardous waste site identified for possible long-term cleanup under Superfund. The list is based primarily on the score a site receives from the Hazard Ranking System. The EPA is required to update the National Priorities List at least once a year.

Natural Resources. Land, fish, wildlife, air, water ground water, drinking water supplies and other such resources belonging to, managed by, or controlled by the United States, a state or local government, any foreign government, any Indian tribe, or any member of an Indian tribe.

Natural Resource Damage Assessment. A process that authorizes Natural Resource Trustees to seek compensation for the public for injuries to natural resources, and then restore, rehabilitate, replace or acquire equivalent natural resources.

Natural Resource Trustees. Public officials who act on behalf of the public to protect and restore natural resources, and to obtain monetary damages for injuries to those resources. The President designates trustees in the National Contingency Plan.

NPL. See National Priorities List.

NRDA. See Natural Resource Damage Assessment.

Operable Unit. A distinct area within a site that is being cleaned up. Operable Units, or OUs, can address specific site problems, geographic areas, or areas where a specific action is required. The number of OUs created for a site depends on the complexity of the site's problems.

OU. See Operable Unit.

PCB. See Polychlorinated Biphenyl.

Pilot Project. A small-scale, short-term experiment or trial run to test a new concept, process or approach before potentially implementing on a larger scale.

Polychlorinated Biphenyl. Polychlorinated biphenyls, or PCBs, are a group of man-made organic chemicals that are a combination of carbon, hydrogen, and chlorine atoms. PCBs are colorless to light yellow in color and can be oily or waxy in consistency, with no known smell or taste. PCBs were produced in the United States from 1929 to 1979 and were used in many products, including:

- Electrical equipment such as capacitors and transformers
- Paints, plastics, and rubber products
- Microscope oils
- Electric appliances like televisions and refrigerators
- Dirt roads to control dust

PCBs were banned in the US in 1979, but they are still widely distributed in the environment due to their persistence. They can enter the air, water, and soil during manufacturing and use, and can also be released into the environment through accidental spills and leaks, or transformer fires. PCBs can be found in many foods, including fish, meat, poultry, dairy products, and breast milk, which can be a significant source of human exposure.

Potentially Responsible Parties: Any individual or company (including owners, operators, transporters or generators that has been identified as being potentially responsible for or contributing to a spill or other potential contamination at a Superfund site. Whenever possible, through administrative and legal action, the EPA requires PRPs to clean up hazardous sites that have been contaminated.

Public Comment Period(s). A formal opportunity for community members to review and contribute written comments on various the EPA documents or actions.

Public Meeting(s). Formal public sessions that are characterized by a presentation to the public followed by a question-and-answer session. Formal public meetings may involve the use of a court reporter and the issuance of transcripts. Formal public meetings are required only for the proposed plan and record of decision amendments.

PRPs: See Potentially Responsible Parties.

RCRA. See Resource Conservation and Recovery Act.

Record of Decision. A ROD is a legal, technical and public document that explains which cleanup alternative will be used at a Superfund NPL site. The ROD is based on information and technical analysis generated during the remedial investigation and feasibility study and consideration of public comments and community concerns.

Remedial Investigation and Feasibility Study. The RI/FS phase of the process determines the nature and extent of contamination at the site, develops cleanup options for addressing the contamination and evaluates and compares the performance and costs of the various cleanup options.

Remedial Design. The RD phase of the process includes preparing for the cleanup at the site. It is during this phase that the engineering plans are developed for implementing the cleanup option the EPA selected.

Remedial Project Manager. The EPA or state official responsible for overseeing on-site remedial action.

Resource Conservation and Recovery Act. The Resource Conservation and Recovery Act, or RCRA, gives the EPA the authority to control hazardous waste from cradle to grave. This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled the EPA to

address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

RD. See Remedial Design.

RI/FS. See Remedial Investigation and Feasibility Study.

RPM. See Remedial Project Manager.

ROD. See Record of Decision.

SAA. See Superfund Alternative Approach.

SARA. See Superfund Amendments and Reauthorization Act.

Sediment. Soil, sand and minerals washed from land into water, especially after rain. Sediment piles up in reservoirs, rivers and harbors.

Sediment Management Area. An area where sediment is managed to prevent degradation. Sediment management is a broad range of activities that can include anything from removing dry gravel to dredging river channels. Sediment management can also involve:

- Using natural processes to solve engineering problems and improve natural resources.
- Researching, developing, and providing tools to manage the environment.
- Using best management practices to use sediments more efficiently and effectively.
- Using short and long-term solutions that are environmentally sustainable and economically viable.

Segments. Three-to-five-mile areas along the Tittabawassee and upper Saginaw Rivers (about 30 miles overall) that are targeted for cleanup in a phased, upstream to downstream approach.

Settlement Agreement. A legal agreement formalizing that a PRP will perform all or part of a Superfund site cleanup.

SMA. See Sediment Management Area.

Superfund. The program operated under the legislative authority of CERCLA that funds and carries out the EPA solid waste emergency and long-term removal and remedial activities. These activities include establishing the National Priorities List, investigating site for inclusion on the list, determining their priority and conducting and/or supervising cleanup and other remedial actions.

Superfund Amendments and Reauthorization Act. Modifications to the Comprehensive Environmental Response, Compensation and Liability Act, enacted on October 17, 1986.

Superfund Alternative Approach. The Superfund Alternative Approach, or SAA, uses the same investigation and cleanup process and standards that are used for sites listed on the NPL. The SAA is an alternative to listing a site on the NPL; it is not an alternative to Superfund or the Superfund process.

The SAA can potentially save the time and resources associated with listing a site on the NPL. As long as a PRP enters into an SAA agreement with the EPA, there is no need for the EPA to list the site on the NPL (although the site qualifies for listing on the NPL).

TAG. See Technical Assistance Grant.

TANA. See Technical Assistance Needs Assessment Tool.

TAP. See Technical Assistance Plan.

TASC. See Technical Assistance Services for Communities.

Technical Assistance. Technical assistance is the provision of services designed to increase a community's understanding of the science, regulations and policy related to environmental issues and the EPA actions at Superfund sites. Several types of technical assistance resources enable communities to better understand local environmental issues and participate in decision-making at Superfund sites.

Technical Assistance Grant. This grant provides money for activities that help communities participate in decision making at eligible Superfund sites.

Technical Assistance Needs Assessment Tool. A TANA helps the EPA determine what technical assistance resources and information the Agency can provide to meet community needs

Technical Assistance Plan. A Technical Assistance Plan, or TAP, enables community groups to retain the services of an independent technical advisor to help interpret and understand technical site information. The TAP can also provide resources for a community group to help other community members learn about site decisions.

Technical Assistance Services for Communities. This program supplies communities with technical help so they can better understand the science, regulations and policies of environmental issues and the EPA actions.

Toxic Equivalence Concentration. A complex formula to determine the levels of toxicity of a mixture of dioxins and dioxin-like compounds.

Upstream-to-Downstream. Comprehensive cleanup will start upstream in the Tittabawassee River. Continuous construction, segment by segment, will result in less contamination moving downstream into the Saginaw River and Saginaw Bay.

Appendix B

List of Contacts

Environmental Protection Agency Officials

Diane Russell
Community Involvement Coordinator
1300 Bluff Street, Suite 105
Flint, MI 48504
989-395-3493
russell.diane@epa.gov

Colleen Moynihan
Remedial Project Manager
25063 Center Ridge Rd.
Westlake, OH 44145
440-250-1702
moynihan.colleen@epa.gov

Amelia Holcomb
Community Involvement Coordinator
77 W. Jackson Blvd.
Chicago, IL 60604
312-886-6242
holcomb.amelia@epa.gov

Sarah Friedman
Remedial Project Manager
77 W. Jackson Blvd.
Chicago, IL 60604
312-886-6707
friedman.sarah@epa.gov

Michigan State Department Officials

Elizabeth Vanderhoef, Geologist
Permitting and Program Support Unit
Hazardous Waste Section
Materials Management Division
Michigan Department of Environment, Great Lakes, and Energy
525 West Allegan St.
Lansing, Michigan 48933
517-388-2644

T. Joost van 't Erve, PhD.
Toxicologist
Toxicology and Assessment Section
Division of Environmental Health
Michigan Department of Health and Human Services
333 S. Grand Avenue, 3rd Floor
Lansing, Michigan 48933
517-648-8227 vantervej@michigan.gov

Federal Elected Officials

Elissa Slotkin
Senator
731 Hart Senate Office Building
Washington, DC 20510
202-224-4822

Lansing Office
315 W. Allegan St.
Lansing, MI 48933
517-993-0510
https://www.slotkin.senate.gov/

Gary Peters
Senator
Hart Senate Office Building, Suite 724
Washington, DC 20510
202-224-6221

Lansing Office
124 W Allegan St.
Lansing, MI 48933
517-377-1508
https://www.peters.senate.gov/

Kristen McDonald Rivet
US Congressman – District 8
200 Cannon Office Building
Washington, DC 20515
202-225-3611

Flint District Office
601 Saginaw Street
Flint, MI 48502
810-238-8627
https://mcdonaldrivet.house.gov/

State Elected Officials

Gretchen Whitmer
Governor
P.O. Box 30013
Lansing, MI 48909
517-335-7858
www.michigan.gov/whitmer

Jennifer Wortz
State Senator, District 35
P.O. Box 30014
Lansing, MI 48909-7536
517-373-1788
JenniferWortz@house.mi.gov

Timothy Beson
State Representative, District 96
S-1285 House Office Building
P.O. Box 30014
Lansing, MI 48909
517-373-0158
timothybeson@house.mi.gov

Bay County Officials

James Barcia
County Executive
515 Center Ave., Suite 401
Bay City, MI 48708
989-895-4130
countyexecutive@baycounty.net

Kathy Niemiec
Commissioner, 1st District
693 N Carter Rd.
Linwood, MI 48634
989-697-5509
Niemieck@baycounty.net

Tim Banaszak
Commissioner, 2nd District
27 River Trail Dr.
Bay City, MI 48706
989-501-6565
banaszakt@baycounty.net

Vaughn Begick
Commissioner, 3rd District
5353 Lorraine Ct.
Bay City, MI 48706
989-686-0578
begickv@baycounty.net

Larry Beson
Commissioner, 4th District
1105 E. Smith Street
Bay City, MI 48706
989-408-8549
besonl@baycountymi.gov

Christopher Rupp
Commissioner, 5th District
175 S. Lincoln Road
Bay City, MI 48708
989-415-7913
ruppc@baycountymi.gov

Jesse Dockett
Commissioner, 6th District
1201 Park Avenue
Bay City, Mi 48708
989-493-0656
docketti@baycountymi.gov

Jerome Crete
Commissioner, 7th District
200 N. Powell Road
Essexville, MI 48732
989-737-8808
Cretej@baycountymi.gov

Ryan Manz
Emergency Management Coordinator
1228 Washington Ave.
Bay City, MI 48708
989-895-4112
manzr@baycounty.net

Troy Cunningham
Sheriff
503 3rd St.
Bay City, MI 48708
989-895-4050

Laura Ogar
Director of Environmental Affairs and Community Development
515 Center Ave., Suite 501
Bay City, MI 48708
ogarl@baycounty.net

Midland County Officials

Jeanette Snyder
Commissioner, District 1
220 W Ellsworth St.
Midland, MI 48640
989-832-6381

Mark Bone
Commissioner, District 2
220 W Ellsworth St.
Midland, MI 48640
989-832-6382

Larry Schuelke
Commissioner, District 3
220 W Ellsworth St.
Midland, MI 48640
989-832-6383

Jim Stamas
Commissioner, District 4
220 W Ellsworth St.
Midland, MI 48640
989-832-6386

Todd Gambrell
Commissioner, District 5
220 W Ellsworth St.
Midland, MI 48640
989-832-6387

Eric Dorrien
Commissioner, District 6
220 W Ellsworth St.
Midland, MI 48640
989-832-6388

Alaynah Smith
Commissioner, District 7
220 W Ellsworth St.
Midland, MI 48640
989-832-6389

Bridgette Gransden, CPA
Administrator/Controller
220 W Ellsworth St.
Midland, MI 48640
989-832-6797

Jennifer Boyer
Emergency Management Coordinator
2727 Rodd St.
Midland, MI 48640
989-832-6750

Midland County Health Department
220 W Ellsworth St.
Midland, MI 48640
989-832-6380
MCDPH@co.midland.mi.us

Myron Greene
Sheriff
2727 Rodd St.
Midland, MI 48640
989-839-4630

Saginaw County Officials

Mark Piotrowski
Commissioner, District 1
111 S Michigan Ave.
Saginaw, MI 48602
989-326-6708
mpiotrowski@saginawcounty.com

Jack Tany
Commissioner, District 2
111 S Michigan Ave.
Saginaw, MI 48602
989-737-4725
jtany@saginawcounty.com

Rich Spitzer
Commissioner, District 3
111 S Michigan Ave.
Saginaw, MI 48602
989-397-7844
rspitzer@saginawcounty.com

Sheldon Matthews
Commissioner, District 4
111 S Michigan Ave.
Saginaw, MI 48602
989-233-1750
smatthews@saginawcounty.com

Tracey Slodowski
Commissioner, District 5
111 S Michigan Ave.
Saginaw, MI 48602
989-327-3026
tslodowski@saginawcounty.com

Denny Harris
Commissioner, District 6
111 S Michigan Ave.
Saginaw, MI 48602
989-395-3145
dharris@saginawcounty.com

John Kaczynski
Commissioner, District 7
5 Harlan Ct.
Frankenmuth, MI 48734
989-714-3801
jkaczynski@saginawcounty.com

Gerald Little
Commissioner, District 8
111 S Michigan Ave.
Saginaw, MI 48602
989-274-7828
glittle@saginawcounty.com

Christopher Boyd
Commissioner, District 9
111 S Michigan Ave.
Saginaw, MI 48602
989-284-2537
cboyd@saginawcounty.com

Lisa Coney
Commissioner, District 10
111 S Michigan Ave.
Saginaw, MI 48602
989-906-4956
lconey@saginawcounty.com

Michael Webster
Commissioner, District 11
111 S Michigan Ave.
Saginaw, MI 48602
989-245-4611
mwebster@sagianwcounty.com

Christina Harrington, M.P.H.
Health Officer
989-758-3813
SCHD@saginawcounty.com

Chris Klawuhn, R.S., M.S.A.
Environmental Health Services Director
989-758-3686
eh@saginawcounty.com

William L. Federspiel
Sheriff
311 S Harrison
Saginaw, MI 48602
989-790-5400

Neighborhood Organizations

Bay City Lions Club
306 S Johnson
Bay City, MI 48708
989-667-9661

Saginaw Basin Land Conservancy
706 S Euclid Ave.
Bay City, MI 48706
989-891-9986
www.sblc-mi.org

United Way of Bay County
909 Washington Ave., Suite 2
Bay City, MI 48708
989-893-7508
www.unitedwaybaycounty.org

Bay County Farm Bureau
2450 Midland Rd.
Bay City, MI 48706
989-684-2772
www.michfb.com/bay-county-farm-bureau

Go Great Lakes Bay
515 N. Washington Ave., Fl 3
Saginaw, MI 48607
800-444-9979
www.gogreat.com

Bay City Downtown Management Board
301 Washington Ave.
Bay City, MI 48708
989-893-3573
www.downtownbaycity.com

Bay Area Community Foundation
1000 Adams St., Suite 200
Bay City, MI 48708
989-893-4438
www.bayfoundation.org

Boys & Girls Clubs of the Great Lakes Bay Region
300 W Lafayette
Bay City, MI 48706
989-892-6723
www.boysandgirlsclubsglbr.com/s/

Great Lakes Bay Economics Club
7400 Bay Rd., C149
University Center, MI 48710
989-964-4048
www.glbec.org

Fairway Pines Condo Association
6234 Fairway Pines, Ct. 2
Bay City, MI 48706
574-533-9916

Midland Department of Health and Human Services
1509 Washington St., Suite A
Midland, MI 48640

Bay City Cooperative Market
312 Lafayette Ave., Suite C
Bay City, MI 48708
989-402-5115
www.baycityfood.org

Bay City Afternoon Rotary Club
P.O. Box 42
Bay City, MI 48707

Bay Area Chamber of Commerce
812 N Water St.
Bay City, MI 48708
989-893-4567
www.baycityarea.com

Chippewa Nature Center
400 S Badour Rd.
Midland, MI 48640
989-631-0830
www.chippewanaturecenter.org

Friends of Bay City State Park
3582 State Park Dr.
Bay City, MI 48706
989-667-0717
www.friendsofpark.org

Save Our Shoreline, Inc.
P.O. Box 2307
Bay City, MI 48707-2307
989-793-3711
www.saveourshoreline.org

Bay County Fair & Youth Exposition
800 Livingston St.
Bay City, MI 48708
989-895-3744
www.baycountyfair.com

Bay County Historical Society
321 Washington Ave.
Bay City, MI 48708
989-893-5733
www.bchsmuseum.org

Creekwood Estates Association
3031 Creekwood Circle
Bay City, MI 48706
989-667-4020

Great Lakes Bay Regional Alliance
122 Uptown Dr., Suite 204
Bay City, MI 48708
989-695-6100
www.greatlakesbay.com

Saginaw Basin Land Conservancy
706 S Euclid Ave.
Bay City, MI 48706
989-891-9986
www.sblc-mi.org

Mid-Michigan Community Action Agency
114 S Washington St.
Bay City, MI 48708
989-386-3805
www.mmcaa.org

Mid-Michigan Community Action Agency
1717 Ridgewood Dr., Suite 103
Midland, MI 48642
989-832-7310
www.mmcaa.org

United Way of Midland County
115 Jerome St.
Midland, MI 48640
989-631-3670
www.unitedwaymidland.org

Midland County Fairgrounds
6905 Eastman Ave.
Midland, MI 48642
989-835-7901
www.midlandfair.com

Greater Midland Community Center
2205 S. Jefferson Ave.
Midland, MI 48640
989-832-7937
www.greatermidland.org

Midland Downtown Development Authority
333 W Ellsworth St.
Midland, MI 48640
989-837-3330

Midland Area Community Foundation
76 Ashman Circle
Midland, MI 48640
989-839-9661
www.midlandfoundation.org/

United Way of Saginaw County
100 S Jefferson, 3rd Floor
Saginaw, MI 48607
989-755-0505
www.unitedwaysaginaw.org

First Ward Community Service
1410 N 12th St.
Saginaw, MI 48601
989-753-0411

NAACP Saginaw Branch
515 N Washington Ave., Suite 400
Saginaw, MI 48607
989-752-0614
www.saginawnaacp.org

Saginaw Economic Development Corporation
1315 S Washington Ave., Rm 110
Saginaw, MI 48601
989-759-1395
www.saginaw-mi.com

Saginaw County Community Action Committee
2824 Perkins
Saginaw, MI 48601
989-753-7741
www.saginawcac.org

Adams Boulevard Area Neighborhood
Debbie Melkonian
melkoniandeb51@gmail.com

Cathedral District Neighborhood
Curtis Robinson
989-755-7874
kroby5056@yahoo.com

Covenant Neighborhood
Andrea Foster
information@covenantneighborhoodassociation.org

Downtown Saginaw Association
Dawn Goodrow-Hillier
989-284-3549
dawnofanewdaycoffeehouse@gmail.com

Fairground Neighborhood Association
Juanita Drake
989-753-7018
ndrake2771@sbcglobal.net

Heritage Square
Joshua Koinis
248-496-3191
smochy2004@gmail.com

Houghton-Jones
989-752-1660
information@houghtonjones.org
https://www.houghtonjones.org/

Northeast Saginaw Neighborhood
Larry Campbell
989-753-0859
nosweat3109@aol.com

Northmoor Association
Dale Stamann
989-799-2618
drstamann@gmail.com

Northwest Neighborhood Association
Tina Swanton
989-529-3275
swanton@saginawfoodclub.org

Old Town District
Russell Inman
Alex de Parry
734-216-6600
information@oldtownsaginaw.org

Sherwill Community Association
Kim Wright
989-798-3246
kim1083cw@gmail.com

Wickes Park Community Association
Todd Boone
989-493-2775
trenneaboone@gmail.com

Southwest Saginaw
Ric Russell
989-372-3640
ricrussell58@gmail.com

St Stephen's Area Neighborhood
Marla Comtois
989-792-1249
marla-c@sbcglobal.net

Unity in the Community
Exie Robinson
989-737-9056
robinson.exie@yahoo.com

Saginaw Community Alliance for the People
602 W Iona St.
Lansing, MI 48933
517-487-9539
https://environmentalcouncil.org/members/saginaw-community-alliance-for-the-people/

Saginaw Community Foundation
1 Tuscola St., Ste. 100
Saginaw, MI 48607
989-755-0545
www.saginawfoundation.org

Newspaper

The Bay City Times
989-895-8551
www.mlive.com/bay-city

Midland Daily News
219 E Main St.
Midland, MI 48640
989-835-7171
www.ourmidland.com

The Saginaw News
989-752-7171
www.mlive.com/saginaw

Frankenmuth News
527 N Franklin St., Unit A
Frankenmuth, MI 48734
989-652-3246
www.frankenmuthnews.com

Thomas Township Today Newsletter
249 N Miller Rd.
Saginaw, MI 48609
989-781-0150
www.thomastwp.org/community/newsletters/

Swan Valley Neighbors
jrichardson@bestversionmedia.com

Television

WNEM-TV5
107 N Franklin
Saginaw, MI 48607
989-755-8191
989-758-2100
www.wnem.com

WDCQ-TV19
1961 Delta Rd.
University Center, MI 48710
877-472-7677
TV: wdcq@delta.edu
Radio: wucx@delta.edu
www.deltabroadcasting.org

Appendix C

Community Interview Questions

BASICS

1. Are you a resident in the area?
2. If yes, how long have you lived in the area?
3. Do you own or rent?
4. How do you identify yourself demographically?
5. Was English your first language? What languages are spoken in the community other than English?
6. Are you affiliated with any organization that has an interest in the sites?
    a. What organization?
    b. Have you ever held any political/elected position?

COMMUNICATION

7. Do you have access to the Internet?
8. How do you want to be informed about sites activities?
    a. Mail (Do you want to be on EPA's mail list?)
    b. E-mail (do you want to be on EPA's email list?)
    c. Newspaper (what newspapers?)
    d. Television (what stations?)
    e. Radio (what stations?)
    f. Social Media (what form, Facebook, etc.?)
    g. Websites or online sources
    h. Other means of communication used (such as word of mouth, city/state officials, newsletters)
9. Are you aware of EPA's websites?
    a. If yes, have you been on it?
    b. Have you found what you were looking for?
    c. Other comments:
10. Have you participated in community meetings regarding these sites in the past?
11. If we held a public meeting, would you participate?
    a. If not, what obstacles keep you from attending?
    b. What days, times, and locations would be best for public meetings? (List)
11. How engaged do you want to be regarding EPA's cleanup?
12. Have you received any information about the Tittabawassee River, Saginaw River and Bay site?
    a. If so, when and from whom?
    b. Where are you getting your information about the sites? From whom? In what form?

SITE QUESTIONS and CONCERNS

13. What concerns do you have about the contamination?
14. Do you trust your local government? What about EPA?
15. What is special/important to you about your community?
16. Is there anything else you would like to share about either the site or EPA's involvement with the local community?
17. Do you have any questions?

Appendix D

Information Repositories, Administrative Record, Websites and Meeting Locations

Local Information Repositories

Grace A. Dow Memorial Library
1710 W St. Andrews Road
Midland, Michigan 48640

Hoyt Public Library
505 Janes Avenue
Saginaw, Michigan 48607

Alice and Jack Wirt Public Library
500 Center Avenue
Bay City, Michigan 48708

Regular Library Hours – Hoyt Public Library

Monday	9:00 a.m. – 8:00 p.m.
Tuesday	9:00 a.m. – 8:00 p.m.
Wednesday	9:00 a.m. – 8:00 p.m.
Thursday	9:00 a.m. – 8:00 p.m.
Friday	9:00 a.m. – 5:00 p.m.
Saturday	9:00 a.m. – 5:00 p.m.
Sunday	Closed

Regular Library Hours – Grace A. Dow Memorial Library

Monday	9:00 a.m. – 7:30 p.m.
Tuesday	9:00 a.m. – 7:30 p.m.
Wednesday	9:00 a.m. – 7:30 p.m.
Thursday	9:00 a.m. – 7:30 p.m.
Friday	10:00 a.m. – 5:00 p.m.
Saturday	10:00 a.m. – 5:00 p.m.
Sunday	Closed

Regular Library Hours – Alice and Jack Wirt Public Library

Monday	10:00 a.m. – 8:00 p.m.
Tuesday	10:00 a.m. – 8:00 p.m.
Wednesday	10:00 a.m. – 8:00 p.m.
Thursday	10:00 a.m. – 8:00 p.m.
Friday	9:00 a.m. – 5:00 p.m.
Saturday	9:00 a.m. – 5:00 p.m.
Sunday	Closed

Official Information Repository

EPA Region 5 Superfund Records Center
77 W. Jackson Blvd.
Room 711, 7th Floor
Ralph Metcalfe Federal Building
Chicago, IL 60604

EPA site Webpage

www.epa.gov/superfund/tittabawassee-river

Possible Meeting Locations

Thomas Township Library
8207 Shields Drive
Saginaw, MI 48609

Freeland Memorial Park Building
150 Park Street
Freeland, MI 48623

Saginaw Valley State University
7400 Bay Road
University Center, MI 48710

Saginaw Famers' Market
203 S Washington Ave.
Saginaw, MI 48607

Freeland Sports Zone
5690 Midland Road
Freeland, MI 48623

Heritage High School Auditorium
3465 N Center Road
Saginaw, MI 48603

Hoyt Library Auditorium
505 James Avenue
Saginaw, MI 48607

Saginaw City Hall
1315 S Washington Avenue
Saginaw, MI 48601

Zilwaukee Community Hall
530 W Fisher Street
Saginaw, MI 48604

Delta College Planetarium
100 Center Avenue
Bay City, MI 48708

Appendix E

Communications to the Community

Below are a few of the most recent communications to the community. To view additional communications dating back to 2007, please visit the site's website at www.epa.gov/superfund/tittabawassee-river and go to the "site Documents and Data" page.

United States Environmental Protection Agency

Cleanup Numbers Developed for Tittabawassee River Floodplain

February 2024

Tittabawassee River, Saginaw River & Bay Site
Midland, Saginaw, and Bay City, Michigan

For more information
Please contact any of the following team members with questions:

EPA
Diane Russell
Community Involvement Coordinator
989-395-3493
russell.diane@epa.gov

Colleen Moynihan
Remedial Project Manager
440-250-1702
moynihan.colleen@epa.gov

You may also call EPA toll-free: 800-621-8431, weekdays, 9:00 a.m. to 5:30 p.m.

EGLE
Dan Dailey
Environmental Engineer Specialist
517-242-7261
daileyd@michigan.gov

DOW
Project Information Line
989-638-3100
(leave a message and you will receive a call back)

Webpage and Repositories
For more details about the site, visit the webpage at: *www.epa.gov/superfund/tittabawassee-river* or visit one of the following repositories to review site documents:

Grace A. Dow Memorial Library
1710 W. Saint Andrews St., Midland

Hoyt Main Library
505 Janes Ave., Saginaw

Alice and Jack Wirt Public Library
500 Center Ave., Bay City

The U.S. Environmental Protection Agency, working with the Michigan Department of Environment, Great Lakes, and Energy (EGLE), is cleaning up dioxin-contaminated soil in frequently flooded areas along the Tittabawassee River – sometimes called the eight-year floodplain EPA is also evaluating properties along the 22 miles of the Saginaw River. EPA's goal is to protect everyone who lives, works or plays in the floodplain.

The two agencies have agreed on what EPA calls "site-specific cleanup numbers," or exactly how much dioxin warrants a cleanup. These numbers are unique to the floodplain area.

EPA will clean up Maintained Residential Areas with more than 250 parts of dioxins in a trillion parts of soil – a measure known as "parts per trillion," or "ppt." This applies to floodplain portions of homeowners' yards, places used as lawns, play areas, gardens, etc.

The Agency will clean up Other Land Use Areas with more than 2,000 ppt of dioxins. This applies to floodplain portions of farms, parks, commercial properties, and natural areas, including unmaintained parts of properties and the Shiawassee National Wildlife Refuge. These areas are categorized as "Zone C' on the map on the reverse side of this page.

How the cleanup numbers will be applied

Not every floodplain property will need a cleanup. The federal and state agencies will work together to evaluate each property in the eight-year floodplain. If dioxin levels at a property are higher than the appropriate site-specific cleanup number, EPA will direct Dow to contact the property owner and work closely with the owner on specific plans and schedules. Once the cleanup is done – or if no cleanup is needed – EPA will give the owner a confirmation letter.

How the cleanup numbers were developed

In developing the cleanup numbers, EPA and EGLE considered many factors, all unique to the floodplain, including:

- **Climate.** In this part of Michigan, the ground is snow-covered or frozen for about 90 days a year. On those "indoor days," people are not exposed to soil at all.
- **Exposures from house dust and soil.** Dioxin levels in dust are lower than in floodplain soil. EPA assumed people are exposed only to dust on indoor days. On outdoor days, the assumption is 45 percent of exposure is from soil and 55 percent from dust.
- **Amount of dioxins that may be taken up into the body.** Dow ran tests on animals using floodplain soil to see how much dioxin is taken into the body. This is called a "bioavailability study." Floodplain dioxins are not completely bioavailable. Tests on rats and pigs showed that, on average, 43 percent of the dioxins got into their bodies.

(*continued on the reverse page*)

- **Where people spend time and how they use the floodplain**. People use different parts of the floodplain in different ways, so exposure varies.

There are three areas where soil exposure may occur (*see the figure below)*. Zone A includes areas around homes outside the floodplain; no cleanup is expected here because dioxin levels are typically low. Zone B includes Maintained Residential Areas, where the 250 ppt level applies because the potential for exposure is greater than in other areas. Zone C includes Other Land Use Areas—such as farms or natural areas—where the 2,000 ppt level applies because the potential for exposure to dioxin is lower than in Maintained Residential Areas.

EPA and EGLE estimated exposure frequency in each zone to develop cleanup numbers. To come up with numbers for all age groups, the agencies considered factors such as body weight, skin surface area and amount of soil ingested, evaluating all health risks. The final numbers are based on young children, who are most sensitive.

When people work or play outdoors, they can accidentally eat a small amount of dirt or get dirt on their skin. When the dirt is contaminated, people are exposed to small amounts of dioxins. EPA's cleanup numbers will ensure people are safe when they come in contact with Tittabawassee floodplain soil.

The cleanup numbers are not based on potential exposure from eating animals raised or caught on the floodplain, or on potential ecological risks. EPA and EGLE will continue to evaluate those exposures.

Dioxins and potential exposure

EPA and EGLE have studied the Tittabawassee River extensively and are starting to evaluate the Saginaw River further. Dioxins, primarily furans, are the main contaminant in floodplain soil. Levels vary, and some areas are not contaminated at all. The term "dioxins" refers to a large family of similar chemicals, including furans. EPA has concluded that dioxins may cause cancer or other health effects such as thyroid or reproductive issues, depending on exposure.

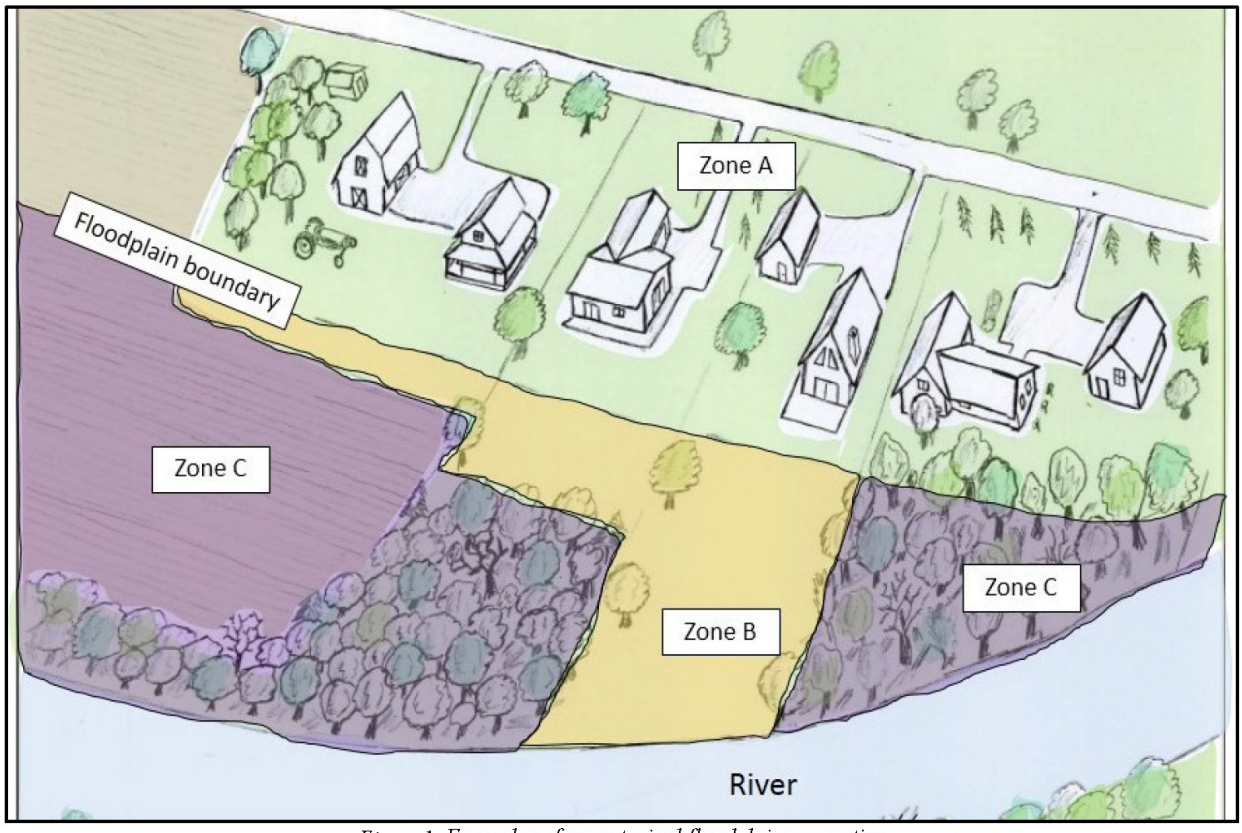


Figure 1: Examples of some typical floodplain properties
Zone A: Outside the floodplain, where levels are safe, and no cleanup is expected.
Zone B: Maintained Residential Areas where the cleanup number of 250 ppt applies.
Zone C: Other Land Use Areas where the cleanup number of 2,000 ppt applies.

EPA's Cleanup Plan for the Tittabawassee River Floodplain

Tittabawassee River, Saginaw River & Bay Site
Midland, Saginaw, and Bay City, Michigan

February 2024

For more information
Please contact any of the following team members with questions:

EPA
Diane Russell
Community Involvement Coordinator
989-395-3493
russell.diane@epa.gov

Colleen Moynihan
Remedial Project Manager
440-250-1702
moynihan.colleen@epa.gov

You may also call EPA toll-free: 800-621-8431, weekdays, 9:00 a.m. to 5:30 p.m.

EGLE
Dan Dailey
Environmental Engineer Specialist
517-242-7261
daileyd@michigan.gov

DOW
Project Information Line
989-638-3100
(leave a message and you will receive a call back)

Webpage and Repositories
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Grace A. Dow Memorial Library
1710 W. Saint Andrews St., Midland

Hoyt Main Library
505 Janes Ave., Saginaw

Alice and Jack Wirt Public Library
500 Center Ave., Bay City

In 2015, the U.S. Environmental Protection Agency, working with the Michigan Department of Environment, Great Lakes, and Energy, or EGLE, selected a plan to cleanup dioxin contaminated soil in frequently flooded areas along the Tittabawassee River. Initial evaluations have been completed along the floodplain, which includes about 4,500 acres and extends along 21 miles of the river resulting in the cleanup of approximately 107 properties. (*see Page 2*).

EPA's cleanup plan will ensure that people are safe when they come in contact with Tittabawassee River floodplain soil. Not all areas in the floodplain will need a cleanup, and areas outside the floodplain are also not expected to need a cleanup. Because floodplain land is used in different ways, the plan calls for a combination of steps:

- Maintained Residential Areas are homeowners' yards that are clearly maintained for typical backyard uses. If tests show a contamination level greater than 250 parts of dioxin in a trillion parts of soil – a measure known as "parts per trillion," or "ppt" – workers will dig up and remove contaminated soil, replace it with clean soil, and restore grasses and plants.
- Other Land Use Areas – such as farms, parks, commercial properties and natural areas—including unmaintained parts of properties and the Shiawassee National Wildlife Refuge—are places where the soil will either be dug up and trucked away for disposal, or covered with clean material if dioxin levels are greater than 2,000 ppt. EPA will work with each property owner on the right approach. After the cleanup, these areas will typically be replanted.

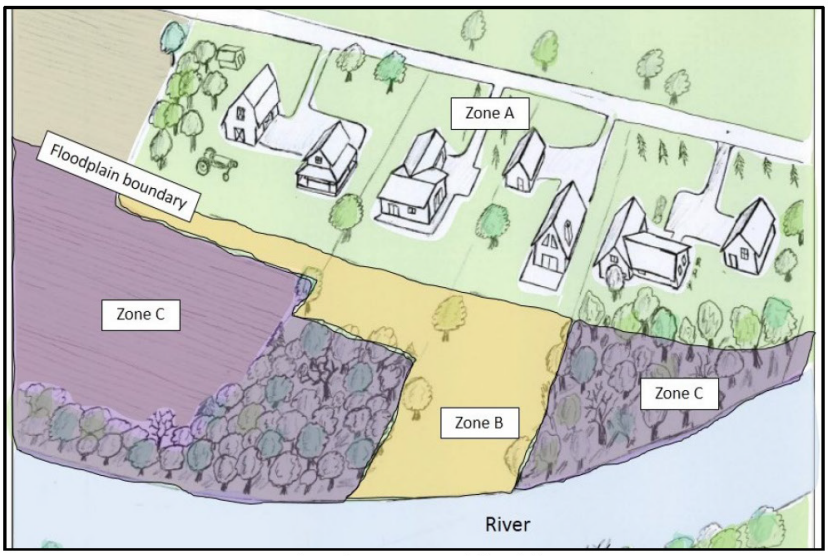


Figure 1: Examples of some typical floodplain properties
Zone A: Outside the floodplain, where levels are safe and no cleanup is expected.
Zone B: Maintained Residential Areas where the cleanup number of 250 ppt applies.
Zone C: Other Land Use Areas where the cleanup number of 2,000 ppt applies.

How will I know if my property needs a cleanup?

Not every floodplain property will need a cleanup. The project team will work together to evaluate each property. Technical experts will review existing information and take new samples, if needed. EPA will consider each property and determine if it should be cleaned up, then present that decision to the owner. Dow has agreed to do the cleanups, with oversight by EPA and EGLE.

If we find dioxin levels lower than the appropriate cleanup number, no further action is needed. If dioxin levels are higher than the cleanup number, EPA will direct Dow to contact the property owner to begin discussions about a cleanup. There will be no cost to owners. Once the cleanup is done – or if no cleanup is needed – EPA will give the owner a confirmation letter.

When will my property be cleaned up?

The river cleanup was divided into seven segments ranging from three to four miles each (*see Figure 2*). Evaluations have been completed in Segments 2-7, but Dow will continue to monitor land use change, and work with property owners that declined evaluation or cleanup during the initial reach out. Cleanup in the floodplain has been done in stages from upstream to downstream, segment-by-segment. Year-by-year, the cleanup moved downstream.

The flow chart below (*Figure 3*) shows what property owners can expect if work is needed on their property. when work begins in their segment. You can contact EPA if you are not sure in which segment your property is located.

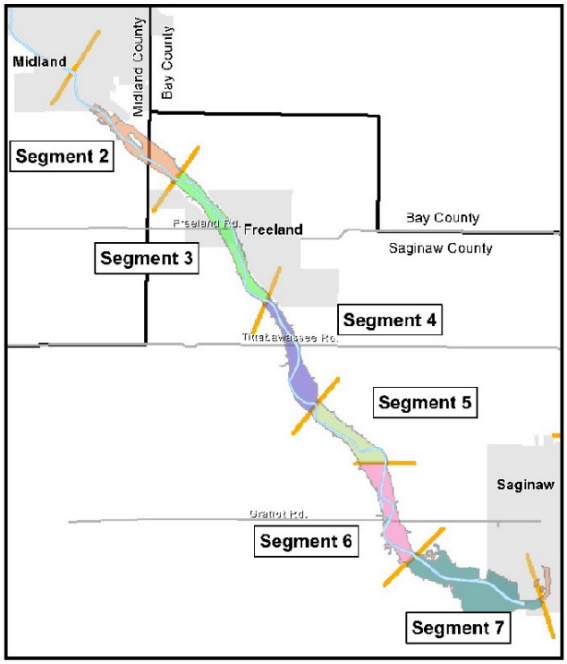


Figure 2: Tittabawassee River floodplain location and anticipated schedule

If I have questions, who can I contact?

EPA has posted Frequently Asked Questions at www.epa.gov/superfund/tittabawassee-river. EPA's contact is Diane Russell in our Flint office. You can contact Diane at 989-395-3493, or russell.diane@epa.gov. Dow's contact for the project is the Dow Tittabawassee River and Floodplain Project Information Line, 989-638-6100.

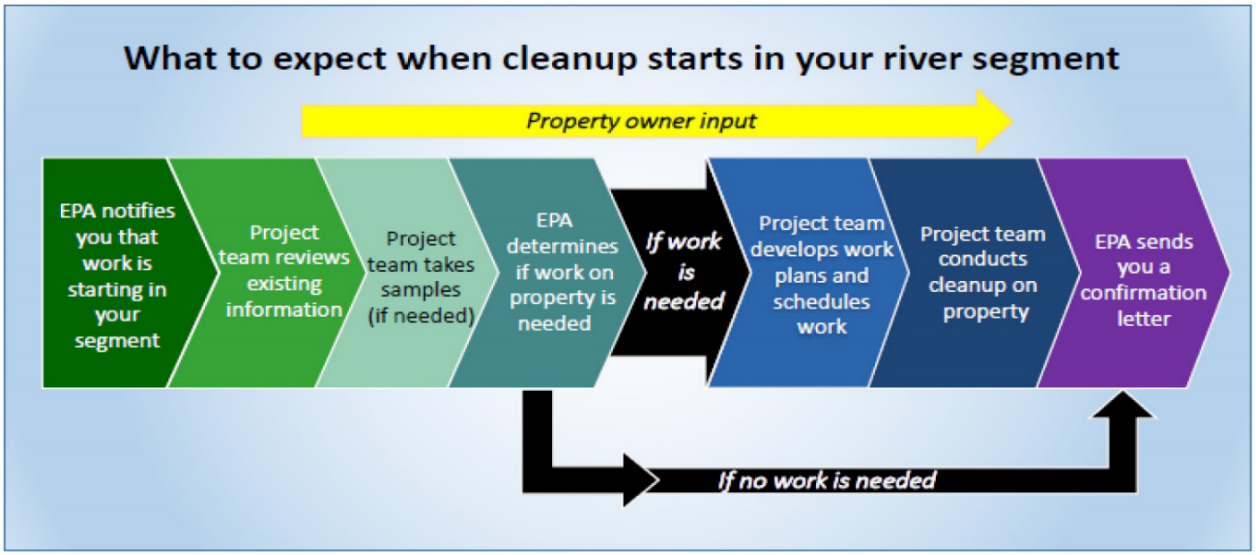


Figure 3: What to expect when cleanup starts in your river segment.

Tittabawassee River Floodplain Soil Cleanup Frequently Asked Questions

The U.S. Environmental Protection Agency has answers to questions you may have about the Tittabawassee River floodplain soil cleanup. These FAQs will be updated as needed.
This version was created February 2024.

Cleanup Decisions

1. **What properties will need a cleanup?**
   Not every floodplain property will need a cleanup. We evaluated properties, or portions of properties, in the floodplain on segment-by-segment basis from upstream to downstream, focusing on frequently flooded areas, i.e., the 8-year floodplain. EPA and the Michigan Department of Environment, Great Lakes, and Energy (EGLE) have developed cleanup numbers specific to the conditions at this site that will help us determine where a cleanup is needed. If we find dioxin levels lower than what we call the "site-specific cleanup number," no further action is needed. If dioxin levels are higher than the appropriate cleanup number, EPA will direct Dow to contact the property owner to begin discussions about a cleanup.

2. **What are the site-specific cleanup numbers?**
   Because the floodplain is used in different ways, EPA and EGLE have developed two site-specific dioxin cleanup numbers for floodplain properties:
   - Maintained Residential Areas – 250 parts of dioxin in a trillion parts of soil, a measure known as "parts per trillion," or "ppt." This applies to portions of yards that are in the floodplain and clearly maintained for typical backyard uses, such as lawns, play areas or gardens.
   - Other Land Use Areas – 2,000 ppt. This applies to floodplain portions of farms, parks, commercial properties and natural areas, including unmaintained parts of properties and the Shiawassee National Wildlife Refuge.

3. **How were the cleanup numbers developed?**
   EPA's cleanup numbers and proposed cleanup actions are designed to protect everyone who lives, works or plays in the floodplain. EPA and EGLE considered factors such as local climate, where people spend time and how they use the floodplain, the amount of exposure people get from house dust vs. soil, and studies on the amount of dioxin that is taken up into the body. For more information, visit www.epa.gov/superfund/tittabawassee-river, or link directly to the fact sheet by visiting: semspub.epa.gov/work/05/988844.pdf.

4. **Will you need to take samples on my property?**
   Cleanup work focused on properties in frequently flooded areas, known as the 8-year floodplain. Initial evaluations of Segment 2-7 have been completed and now EPA is focused on monitoring land use changes and working with property owners that declined evaluation or cleanup during the initial reach out.

5. **What if I don't want cleanup on my property or a particular part of my property?**
   Property owners are not required to provide access for cleanup. Dow will continue to monitor the property for ownership change and reach out to new owners to request access. Dow will also follow-up with property owners to see if they have changed their minds on allowing access for cleanup. Owners will have input on the plans. Through that input we hope to deal with any reservations. EPA will work very closely with you to reconcile your concerns. We hope you will agree to work with us on the cleanup of your property.

How the Cleanup Will Be Conducted

6. **How will properties be cleaned up?**
   For Maintained Residential Areas, workers will dig up and remove contaminated soil, replace it with clean soil, and restore lawns and plants. For Other Land Use Areas, workers will either dig up and dispose of soil or cover it with clean material. In either case, they will replant the area. The project team will work with each property owner on the right approach.

7. **Who will conduct the work?**
   Dow will do all the work under EPA and EGLE's oversight.

8. **Who will pay for the cleanup, and will there be any expense to the property owners?**
   Dow is expected to pay for the cleanups. There will be no expense to the property owners.

9. **Can I stay in my house or use my yard during the work, and will it disrupt any services (mail, water, sewer, electric)?**
   Yes, you can stay in your house. We don't expect any services to be disrupted. However, you may not be able to use some parts of your yard during the cleanup. The project team will work with you on the specific details.

10. **How will the cleanup affect my existing landscaping and trees?**
    We will work with property owners to develop a property-specific plan for the cleanup. We will restore your landscaping when the cleanup is complete. The project team will work with you to see if specific trees or ornamental features can be left in place.

11. **If a cover is placed on my property, how long is it expected to last? How will you know if it's working?**
    To date, no cover has been placed on a floodplain property. If a cover is needed on a property, it is designed to last a long time. EPA always requires monitoring and maintenance of covers to ensure long-term reliability.

12. **Where will the excavated soil go?**
    Excavated soil will be disposed of at a local landfill or an approved area at Dow's Midland plant.

13. **Will the floodplain cleanup include banks?**
    Not necessarily. Bank Management Area (BMA) cleanup work may be conducted during the floodplain yard cleanup. However, we generally expect to clean up the BMA work only if they have high levels of dioxins that could erode back into the river.

Communication

14. **If I have questions, who can I contact?**
    EPA's contact is Diane Russell in our Flint office. You can contact Diane at 989-395-3493, or via email russell.diane@epa.gov. Dow's contact for the project is the "Dow Tittabawassee River and Floodplain Project Information Line," 989-638-6100.

15. How will owners be notified about cleanup plans for their property?

If we determine your property needs a cleanup, we will direct Dow to contact you about the next steps for your property. Since, 2015 floodplain cleanup has been conducted year-by-year and moved downstream, with cleanup of approximately 107 floodplain properties. The flow chart below (Figure 1) shows what property owners can expect if work is needed on their property. Once the cleanup is done – or if no cleanup is needed – we will give you a confirmation letter.

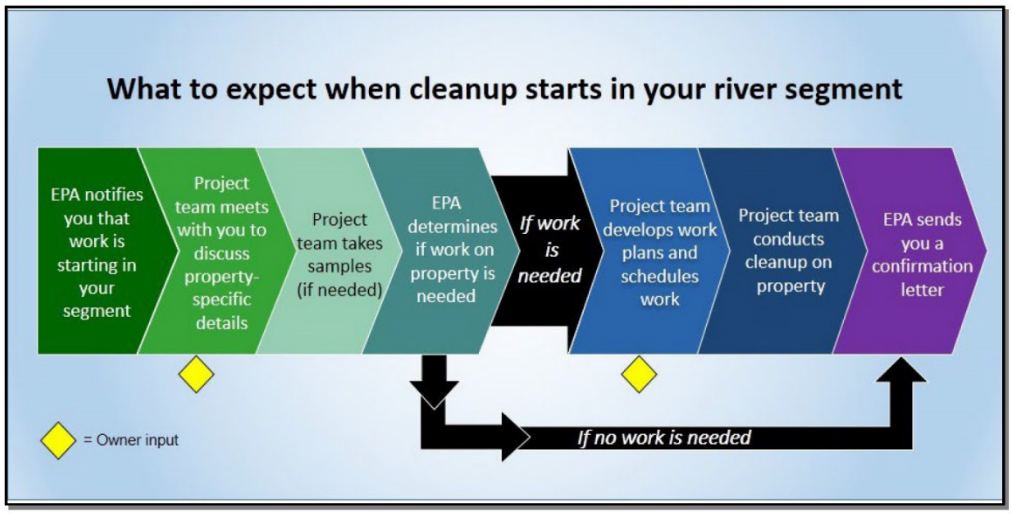


Figure 1: What to expect when cleanup starts in your river segment.

Timing of Work

16. When did cleanup start and how long will it take?

EPA divided the floodplain into six segments ranging from three to four miles each (Segments 2 – 7: Please see figure 2 on the next page) and in 2015 EPA started cleanup in Segment 2. Since 2015, Dow has evaluated properties in Segments 2-7, and has completed cleanups where property owners provided access. Now, Dow is conducting monitoring activities to ensure remedies remain effective (including evaluation for land use changes). Additionally, Dow monitors for ownership changes and reaches out to new property owners to provide information regarding the status of their property and follows up with property owners that have refused sampling. Cleanups have proceeded upstream to downstream, segment-by-segment. In 2015, EPA started cleanup in Segment 2, which means that upstream properties were cleaned up first, followed by those further downstream.

17. When will cleanup on my property start and how long will it take?

How long it takes depends on the size of your property, the cleanup method and its complexity, and weather. Cleanup activities are typically completed within a few weeks, but Dow will monitor properties for a minimum of 2 years to ensure that replanted vegetation establishes.

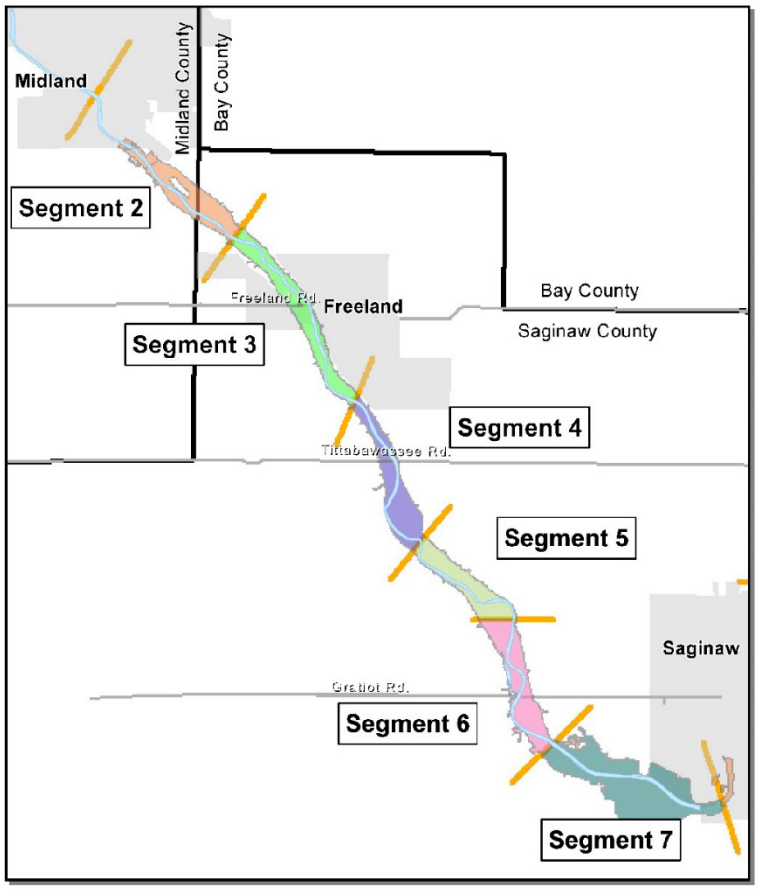


Figure 2: Tittabawassee River floodplain location and anticipated cleanup schedule.

Real Estate/Property Use Questions

18. Are there restrictions on how I can use my property before or after the cleanup happens?

Land use within the floodplain is controlled under existing laws and regulations that restrict construction, development and filling the floodplain. These are unrelated to the cleanup and will continue. However, many properties have been placed in the Tittabawassee River Conservation Program, a voluntary program with agreements the future use of floodplains. For example, long-term agreements could keep land undeveloped and natural through conservation easements or other agreements.

19. When the cleanup is finished, will I be given a letter or certificate stating my property is complete?
Yes. Once the cleanup is done – or if no cleanup is needed – EPA will give you a confirmation letter.

20. Will this cleanup work affect my property value?
Many complex factors may affect property values. EPA does not expect that the cleanups will have negative effects on property values.

21. When the cleanup is finished, will I be required to disclose anything to potential buyers about the cleanup?
That depends on the specific facts and circumstances that apply to your property and its cleanup, as well as laws in effect at the time of sale. You should discuss this with your realtor and attorney when you decide to sell the property.

Flooding

22. If I have a cleanup and it floods, will my property need another cleanup?
That is not expected. Upstream river cleanups, combined with current management practices that control releases from Dow's facility, will help prevent recontamination. We are monitoring places with previous cleanups (for example, West Michigan Park and Riverside Boulevard) to assess the potential for recontamination.

23. Will the cleanup include flood control?
No. Modifying floodways or changing flood patterns is restricted under existing laws and regulations.

Floodplain Use Questions

Both the Michigan Department of Health and Human Services (MDHHS) and EGLE have additional information related to the questions in this section. Please scan the QR codes below for more information. To contact MDHHS for health questions on this site, please call 1-800-648-6942 during business hours, 8:00 am to 5:00 pm, Monday to Friday. To contact EGLE, please call Dan Dailey at 517-242-7261, or via email at DaileyD@michigan.gov.

MDHHS Dioxin Information

EGLE Dioxin Information

24. Is it safe to eat fruits and vegetables grown in the floodplain?
Yes. Studies show fruits and vegetables do not take up dioxin from the soil. But MDHHS and EGLE recommend you wash fruits and vegetables to remove any soil or dust, and peel root vegetables such as carrots, potatoes, and beets.

25. Is it safe to raise livestock in the floodplain?

MDHHS, EGLE, and the Michigan Department of Agriculture and Rural Development recommend that you not consume products such as milk, meat and eggs from livestock raised in the Tittabawassee River floodplain. They don't expect that to change after the cleanup.

26. Once cleanup is done, will the fish and wild game advisories still be in effect?

Yes. MDHHS is responsible for issuing the advisories. EPA and EGLE will share information with MDHHS to see if the advisories can be removed or reduced over time.

27. How do I find out if my property is within the 8-year floodplain and if cleanup is needed?

If you have questions about your property, contact EPA's Community Involvement Coordinator Diane Russell at 989-395-3493, or via e-mail at russell.diane@epa.gov. You may also contact Dow's Tittabawassee River and Floodplain Project Information Line at 989-638-6100.

For More Information

Diane Russell
Community Involvement Coordinator
989-395-3493
russell.diane@epa.gov

Colleen Moynihan
Remedial Project Manager
440-250-1702
moynihan.colleen@epa.gov

www.epa.gov/superfund/tittabawassee-river

Appendix F

Community Guide to Sediment Management Areas and Bank Management Areas

COMMUNITY GUIDE

to Sediment Management Areas and Bank Management Areas

How did the Tittabawassee River Become Contaminated?

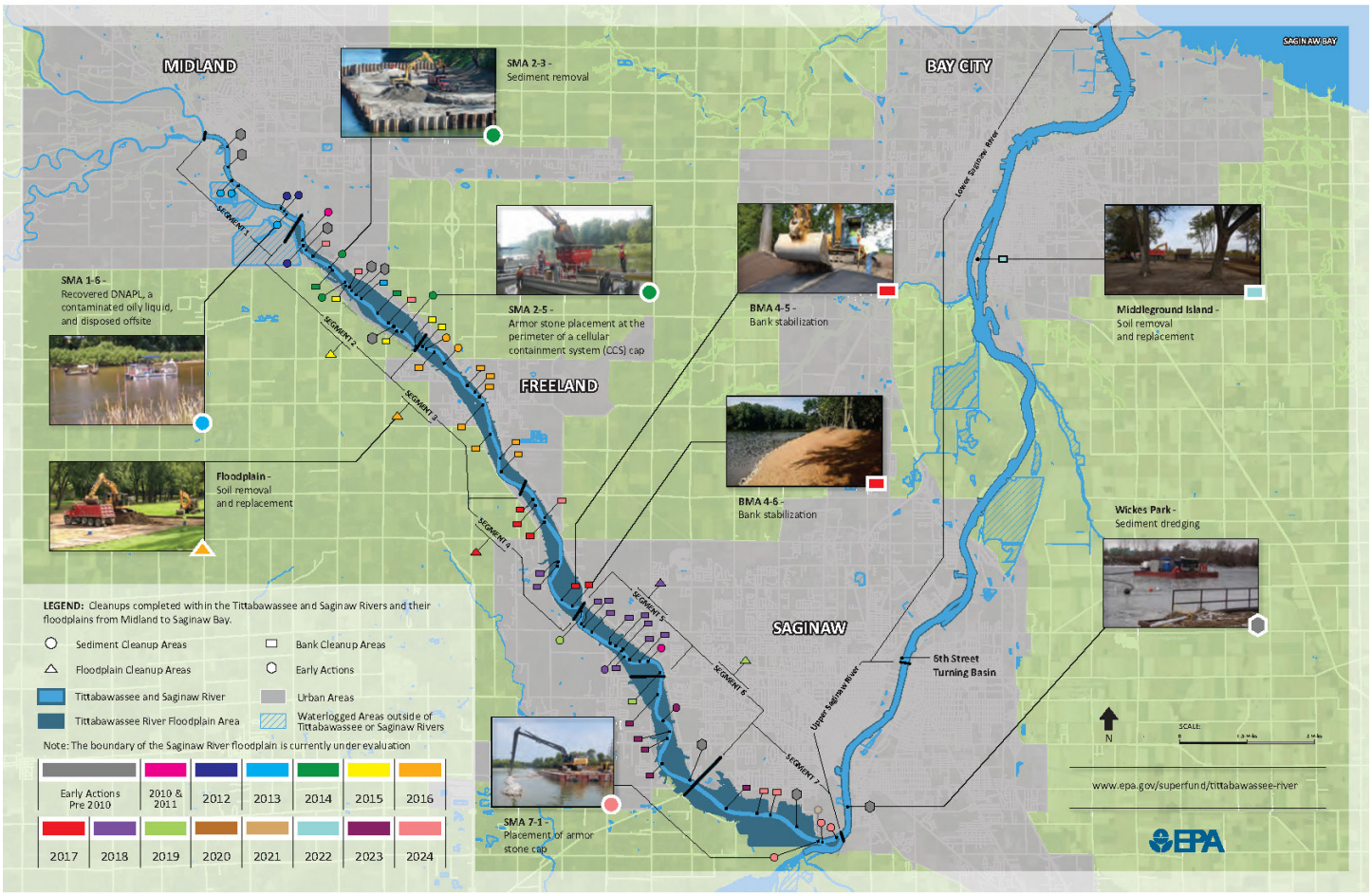
Dow Chemical Co., or Dow, has been operating at its Midland plant since the 1890s. Dioxin (primarily furans) is found in and along the Tittabawassee and Saginaw Rivers and in Saginaw Bay from former waste management practices at Dow's Midland plant. In the past, chemicals got into the Tittabawassee River, where they settled in some sediment and built up in some riverbanks. Current waste management practices ensure no unacceptable contaminants are released from Dow's facility.

"Dioxin" refers to a large family of similar chemicals, including furans. The U.S. Environmental Protection Agency, or EPA, has concluded that dioxin may cause cancer or other health effects, such as skin problems, liver damage and reproductive issues, depending on exposure. Dioxin is not created intentionally but can be formed by human activity or naturally – by fires, for example. Dioxin binds strongly to soil or sediment particles and does not dissolve in water easily.

How are agencies and Dow cleaning up the river?

EPA, working with the Michigan Department of Environment, Great Lakes, and Energy, or EGLE, is overseeing Dow's investigation and cleanup of the river. Together, they took early actions from 2007 to 2011. EPA then divided the Tittabawassee River into seven segments ranging from 3 to 4 miles each for cleanup working stages from upstream to downstream, as depicted in the figure below.

Dow started cleanups in Segment 1, a 3-mile stretch next to Dow's Midland plant, in 2012. Cleanups have progressed each year, segment by segment. EPA selected the cleanup plans for Segments 6 and 7 in 2019, and Dow completed construction work in the final segment, Segment 7, in 2024.



Why is this cleanup important?

Dioxin can build up in the food chain over time. When people or animals eat fish from the Tittabawassee River, they may be exposed to small amounts of the pollutant. The contamination in deeper sediment and the riverbanks is also a concern because erosion of these areas can move contamination into surface sediment or downstream. EPA has two main cleanup goals: 1) limit the spread of dioxin-contaminated riverbank soil and sediment to reduce dioxin levels in the river and farther downstream and 2) reduce the build up of dioxin in the fish in the Tittabawassee River.

What are Sediment Management Areas?

Sediment Management Areas, or SMAs, are areas within the river that need to be addressed under a cleanup. Cleanups in these areas cover a wide range of activities that include anything from the small-scale removal of dry gravel to the dredging of whole river channels and the reintroduction of removed sediment into the water environment. Sediments are material found at the bottom of a water body. Sediments may include clay, silt, sand, gravel, decaying organic matter and shells. Contaminated sediments present a risk to human health and the environment and limit the use of many water bodies. They are often a contributing factor to fish consumption advisories. As a practice, sediment management can help reduce flood risk or bank erosion, improve land drainage and clean up a water body.

Contaminated sediments may either be left in place and covered with a barrier or removed. Contaminated sediments should not be removed from a site if doing so would cause more harm than leaving them in place. In some cases, leaving sediments in place poses lower risks to the environment than removing them.

How does an SMA Cleanup Work?

The appropriate cleanup option should be selected on a case-by-case basis after careful consideration of the risks posed by the contaminants, the benefits of the cleanup and the costs. Below are the cleanup technologies applied along the Tittabawassee River to limit contaminant exposure to people and wildlife. The site team evaluated three sediment cleanup technologies to be used separately or in combination. Dow sampled the sediment first, and EPA decided which of the following technologies for SMAs was the best fit. Below is a brief description of these sediment technologies:

▶ MONITORED NATURAL RECOVERY, OR MNR

MNR involves leaving contaminated sediment in place. The effectiveness of MNR relies on natural processes to reduce contaminant levels or risks over time. MNR technology must be closely monitored to make sure it is working in an acceptable timeframe.

▶ CAPPING

Capping involves confining sediment in place through the placement of a physical barrier to prevent contact with and migration of contaminated sediment. An example of capping is where clean material, such as sand or gravel, is placed over the contaminated sediment, thereby stabilizing it and preventing erosion and downstream transport. Another type of cap is a cellular containment system, or CCS, cap, which promotes natural sedimentation through the placement of geocells, as seen in the image below. The CCS cap fills naturally with river sand to isolate and contain the sediment and to prevent erosion. In both cases, the capped areas have to be monitored and may need maintenance to ensure long term reliability.

Worker installing CCS cap in Segment 2 of the Tittabawassee River.

▶ REMOVAL

Removal involves dredging contaminated sediment out of the river with heavy equipment. It can be done in either wet or dry conditions. Water is managed, and the sediment is hauled off-site to an approved location for disposal.

What are Bank Management Areas?

Bank Management Areas, or BMAs, are areas along the river that need to be addressed under a cleanup. BMA cleanups usually include technologies that stabilize the bank to stop erosion of contaminated riverbank soil. Bank stabilization involves planting deep-rooted, erosion-resistant, native vegetation. These plants increase habitat diversity along the river. In some cases, the banks have been partly or completely removed.

How does a BMA Cleanup Work?

Below is a brief description of riverbank soil cleanup technologies applied along the Tittabawassee River:

▶ STABILIZATION

Stabilization relies on natural and engineered approaches to prevent erosion of contaminated riverbanks. Stabilization always uses native, deep-rooted plants to enhance the bank's stability. Often, the technology includes approaches like reshaping banks or installing bank stabilization products that control erosion, followed by planting native vegetation, as depicted in the images to the right.

▶ REMOVAL

Removal involves excavating specific bank deposits with heavy machinery and hauling them off-site for disposal at an approved location. All existing vegetation is cleared. After the soil is removed, the area is re-graded and replanted.

Bank stabilization materials

SMA and BMA Cleanups Applied along the Tittabawassee River

Distinct areas in Segments 1 through 7 have required a sediment or bank cleanup. BMAs range in length from approximately 100 to 2,500 feet. For all the BMAs along the Tittabawassee, stabilization was the selected approach. These banks have characteristics where stabilization is effective and creates less of an impact to the existing natural habitats than removal.

For SMAs, a combination of approaches was applied to different segments along the river. To the right is a table showing the number of BMAs and SMAs per segment.

River Segment	Number of SMAs	Number of BMAs
1	7	0
2	5	8
3	2	9
4	0	9
5	3	10
6	1	4
7	3	3

What are the Next Steps?

Dow has conducted cleanups of SMAs and BMAs in Segments 1 through 7 along the Tittabawassee River from 2010 to 2024, and active construction work is now complete. Approximately 5.4 miles of banks and 21 SMAs have been cleaned up in the Tittabawassee River.

After the construction completion, monitoring of SMAs and BMAs will continue annually for years to ensure long-term effectiveness of the remedy. Except for cases where removal was the cleanup, an institutional control plan is in place. Institutional controls include administrative and legal restrictions on land use that help protect cleanup integrity.

You can see documents related to the Tittabawassee River, Saginaw River & Saginaw Bay site at epa.gov/superfund/tittabawassee-river