

EXECUTIVE SUMMARY:
GROUNDWATER POLLUTION AND SB 431/SB 849
Submitted by the Metamora Preservation Advocacy Fund
and Metamora Land Preservation Alliance

October 24, 2020

This package contains six items that help explain the problems with SB 431 and SB 849, with a focus on issues related to groundwater pollution.

1. SB 431 and SB 849 Overview – This overview explains how SB 431 strips away local government’s authority to make decisions regarding gravel mining, processing, and crushing. Instead of decisions made by people who know the community, SB 431 imposes a one-size-fits-all approach using industrial standards written by gravel interests. Likewise, SB 849 pays lip service to the environment but does not actually allow the local community or EGLE to deny a mining permit – even in many cases where an operation would worsen groundwater pollution from a Superfund site.
2. Contamination Sites and Gravel Mines in Michigan – These 5 slides provide an overview of existing contamination sites in Michigan, including Superfund sites on the National Priority List or NPL. The slides document many Superfund sites in areas that also host mining activity. The proximity of contamination sites and gravel mining highlights the importance of making decisions based on local conditions, rather than imposing the statewide blanket mandate sought by special interests.
3. Contamination Overview – This white paper presents key facts about the approximately 7,000 contamination sites in Michigan. These include sites without a liable party to pay for cleanup, Superfund sites, and sites with PFAS contamination. The white paper also discusses the steep obstacles to cleaning up most of these sites.
4. Groundwater and Gravel Mining Primer – These 7 slides show how excavating a mining site can change the direction and grade of groundwater flow, potentially impacting the movement of underground contamination at a site. The slides also show how pumping from a high capacity well can pull polluted groundwater toward it and increase the spread of a contamination plume.
5. Environmental Oversight Myth vs. Reality – This chart sets out many of the inaccurate claims being made by bill proponents about environmental protections purportedly included in the bills, together with the true facts on each subject. Contrary to the gravel industry’s arguments, there is currently no meaningful oversight of how mining can impact groundwater contamination.

6. Metamora Landfill Update – These 5 slides give an update on the Metamora Landfill Superfund Site, which is close to the Levy and American Aggregates proposed mine on a Boy Scout camp in Metamora Township. New sampling data shows that the dioxane contamination plume has now migrated all the way onto the Boy Scout property and is widespread across the area that Levy wants to mine.

What SB 431 Does

1. Eliminates any meaningful approval process and control at the local level.
2. Eliminates nearly all local zoning authority over aggregates mining by authorizing natural resource extraction in all zoning districts by right.
3. Precludes consideration of local issues: known contamination on or near the mining site, sensitive neighbors (such as schools or nursing homes), haul route dangers, proximity to or number of existing mining operations, and other public safety issues.
4. Forces extreme operating conditions on communities by imposing industrial standards for dust, noise, vibration, and operating hours.
5. Caps the amount of financial assurance the local unit of government may require of a producer for reclamation, and delays the onset of reclamation (which may take many years) until mining ceases.
6. Allows an unlimited number of gravel pits within a township or other geographic area.
7. Reverses concepts of master planning and the Zoning Enabling Act's recognition that land use is best regulated at the local level.

How SB 431 Works

Proponents argue SB 431 still uses the “very serious consequences” test, which prohibits a local unit of government from denying a mining permit unless very serious consequences would result from the proposed activity. However, SB 431 would fundamentally alter the current state of the law.

SB 431 presents operators with two choices. By fulfilling the requirements of either option, the applicant establishes that no “very serious consequences” would occur as a result of the aggregates operation.

Option A – local oversight bypass

- Local unit of government must approve aggregates mine if 13 basic pieces of information are provided, such as a site plan, description of haul routes, description of the natural resources deposit, and summary of processing activities.
- This would be the obvious choice of all operators

Option B – Restrictive very serious consequences test (unlikely to ever be selected by operators)

- Traditional very serious consequences factors still apply (relationship and impact to existing land uses, impacts on property values, pedestrian and vehicular traffic, and on other identifiable health, safety, and welfare interests of the local unit of government), BUT...
- For the first time, very serious consequences would result from mining activity only if they “substantially exceed[] the ordinary impacts of customary operations and pose[] an actual and unnecessary risk to public health, safety, or welfare” that cannot be ameliorated through the imposition of reasonable controls or conditions on the mining operations”
- Industry standards are substituted for community standards

If the requirements of either Option A or Option B are met, the local unit of government has no choice but to issue the permit.

What SB 849 Does Not Do

SB 849 is tie-barred to SB 431 and is offered to address concerns that the legislation fails to protect the environment. However, SB 849, as amended, still fails to add any material environmental protections to the legislative package.

Briefly, SB 849:

1. DOES NOT Protect against environmental harms resulting from mining activity

- Proposed Section 1708 of the Natural Resources and Environmental Protection Act is only a lipservice to environmental protection. The Michigan Constitution requires that “[t]he legislature shall provide for the protection of the air, water and other natural resources of the state from pollution, impairment and destruction.” Const 1963, art IV, § 52. The constitutional mandate is already embodied in the Michigan Environmental Protection Act (MCL 324.1701 et seq.).
- Section 1708(3) would clarify that the “excavation and removal of aggregates and of associated overburden does not, of itself, constitute pollution, impairment, or destruction of those natural resources,” thereby further robbing Sections 1708(1) and 1708(2) of any value.

2. DOES NOT Require thorough environmental review of aggregate mining operations’ groundwater use

- A person using a water withdrawal for aggregates mining would be subject to Michigan’s groundwater protection law, MCL 324.32723. However, Part 327 is concerned with water volumes and diversions of water from the Great

Lakes basin and the capacity of the aquifer to withstand the withdrawal, not safety. Part 327 also does not consider the possibility of gravel mining or the water withdrawal itself causing or exacerbating contamination.

- EGLE does not independently verify hydrogeological impacts of a proposed withdrawal when determining whether the permit standards (Section 32723(6)(a)-(f)) are met.

3. DOES NOT prevent contamination from spreading due to aggregate mining

- A person proposing to make a groundwater withdrawal for aggregates mining would be required to notify EGLE if the “aggregates mining area” is adjacent to a Superfund site.
 - Limiting the reporting requirement to sites adjacent to a Superfund site means that mining could commence near hundreds of other contaminated sites throughout Michigan which either don’t qualify as Superfund or have been de-listed from Superfund, without review by EGLE or EPA.
 - “Aggregates mining area” is sufficiently vague to allow operators to scale and situate pits in a way to avoid adjacency and the EGLE notification requirement.
 - Groundwater contamination does not respect property boundaries; migration of contamination is a function of the nature of the contamination plume, connection of underground pathways, and the volume and rate of pumping, not adjacency of properties.
- SB 849 would require that the distance between a well on a Superfund-adjacent mining site be at least equal to the “radius of the standard isolation area for a type I or type IIa public water supply well” as provided in the Safe Drinking Water Act.
 - SB 849 does not require compliance with any other part of the Safe Drinking Water Act.
 - The isolation area radius for a type I or type IIa public water supply well is inappropriate for high-capacity production wells which pump water at a much faster rate and can draw contamination from beneath more distant properties. Contamination traveling towards the production well may be pulled into any well in between, including residential drinking water wells.
 - Requiring operators to install monitoring wells and report to EPA does not create a mandate for EPA to react to any information it receives.

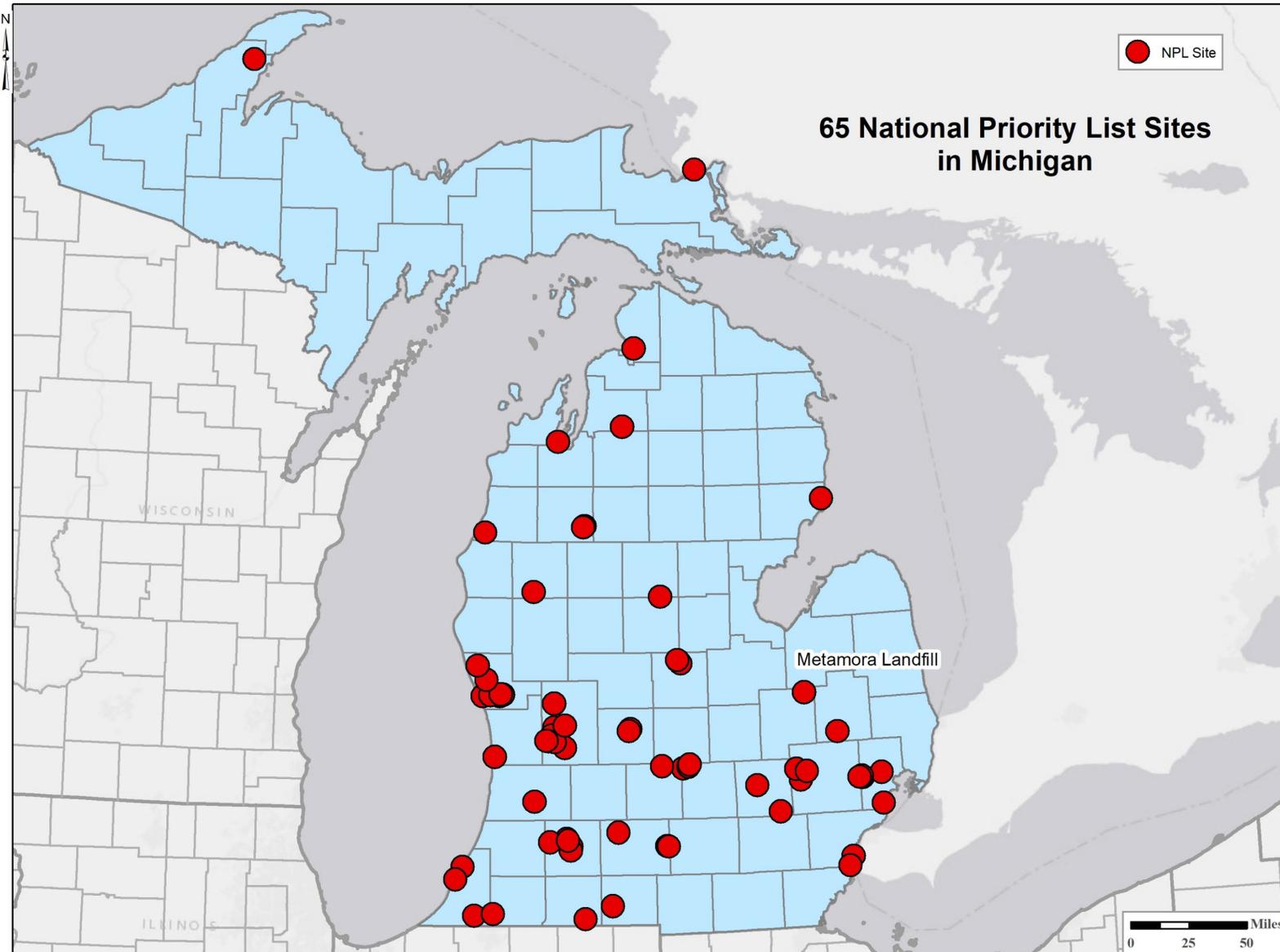
Contamination Sites and Gravel Mines in Michigan

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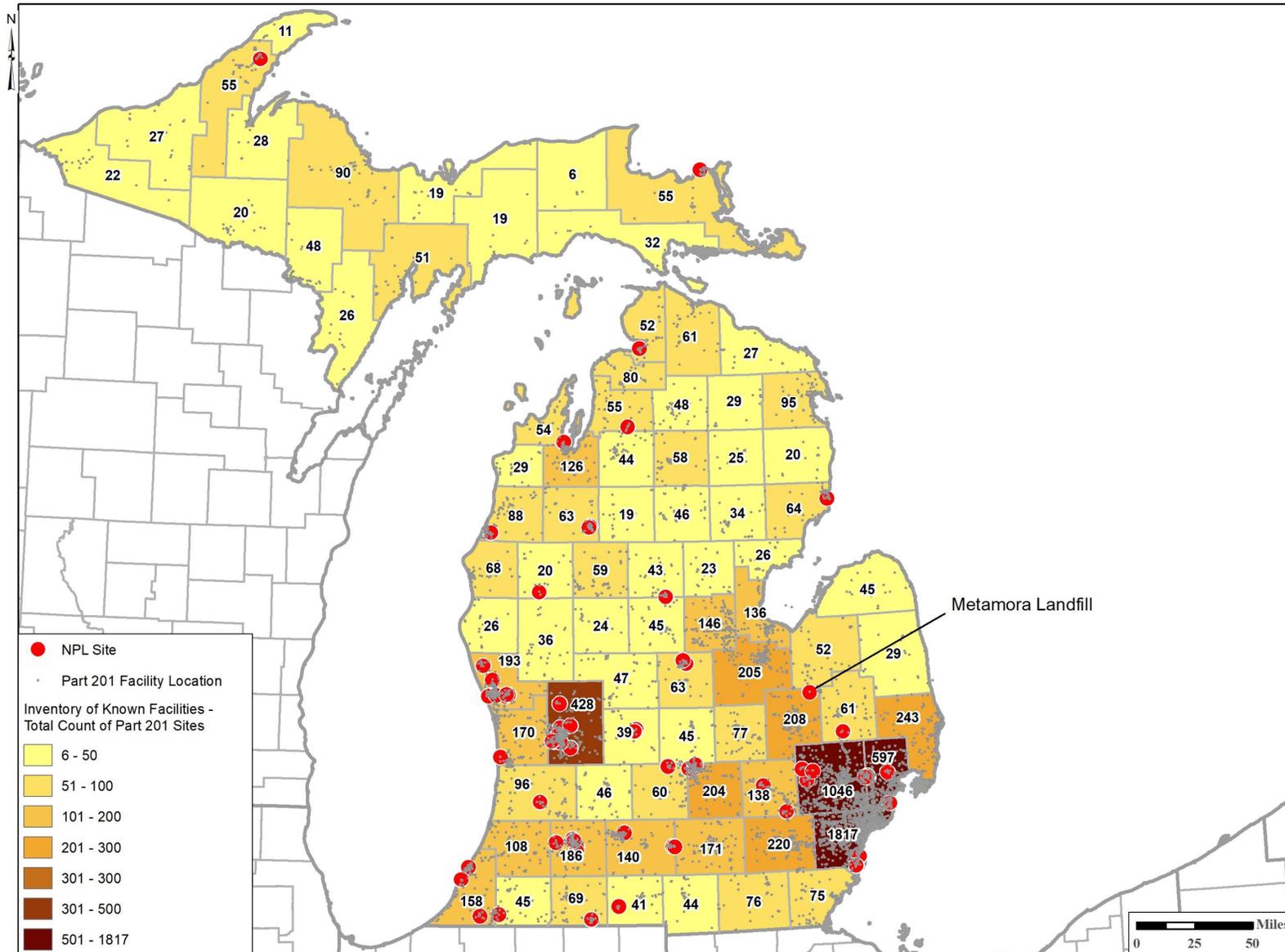
National Priorities List Sites in Michigan



- Superfund NPL Sites
- These are sites of high national priority among the known sites of contamination throughout the US and territories.

Source: U.S. EPA, <https://sempub.epa.gov/work/HQ/201272.pdf>

NPL and MI Inventory of Known Releases

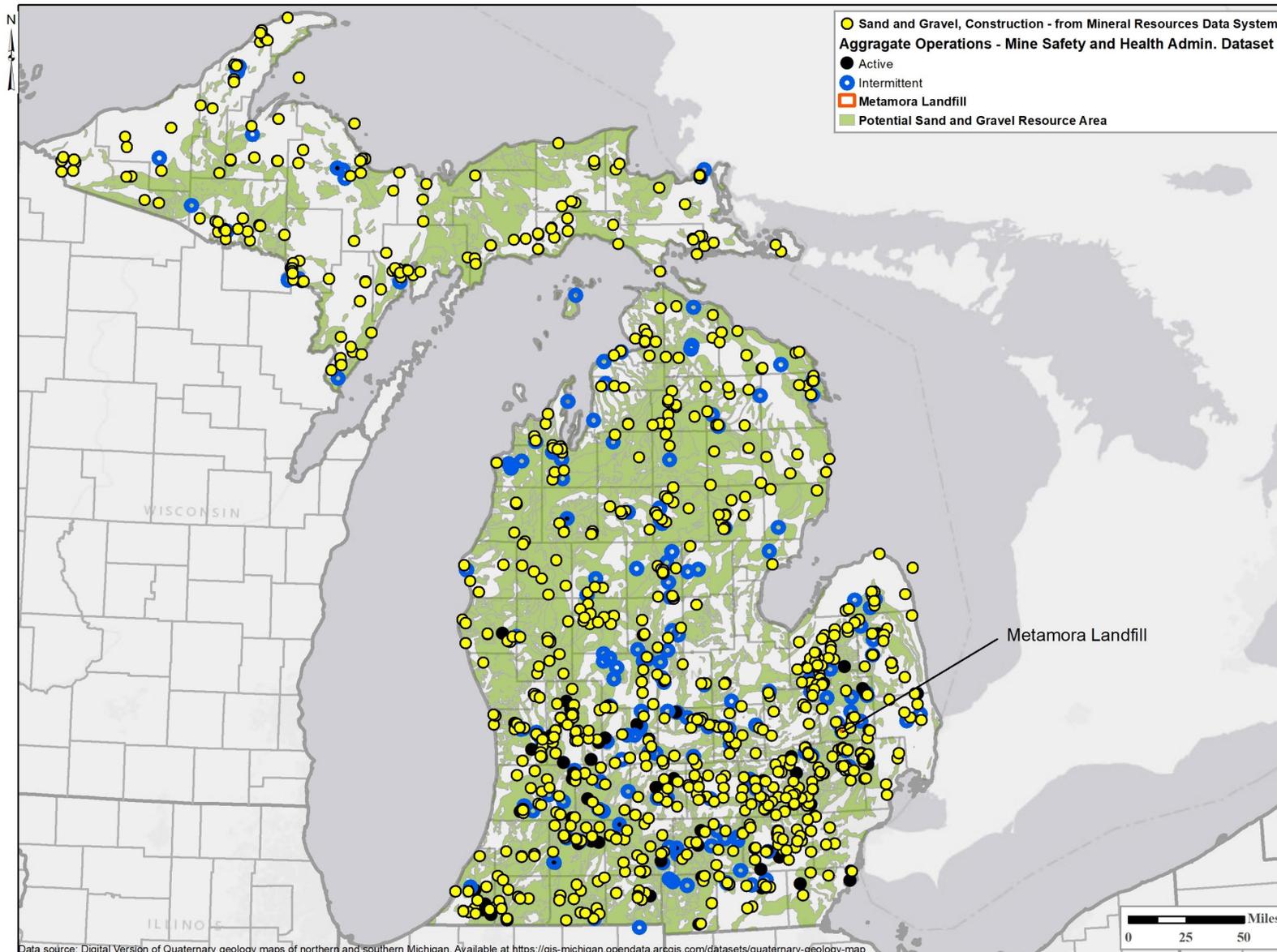


- Superfund NPL Sites + Michigan inventory of known releases
- The inventory of other known facilities consists of all known facilities where there has been a release of a hazardous substance(s) in excess of the Part 201 residential criteria of the NREPA residential risk-based screening levels, and/or where response actions have not been completed under Part 201 to meet the applicable cleanup criteria for unrestricted residential use.

Source: <https://www.egle.state.mi.us/FacilitiesInventoryQueries>;
Includes Part 201 sites with location data provided

Source - NPL Sites: U.S. EPA. <https://semspub.epa.gov/work/HQ/201272.pdf>

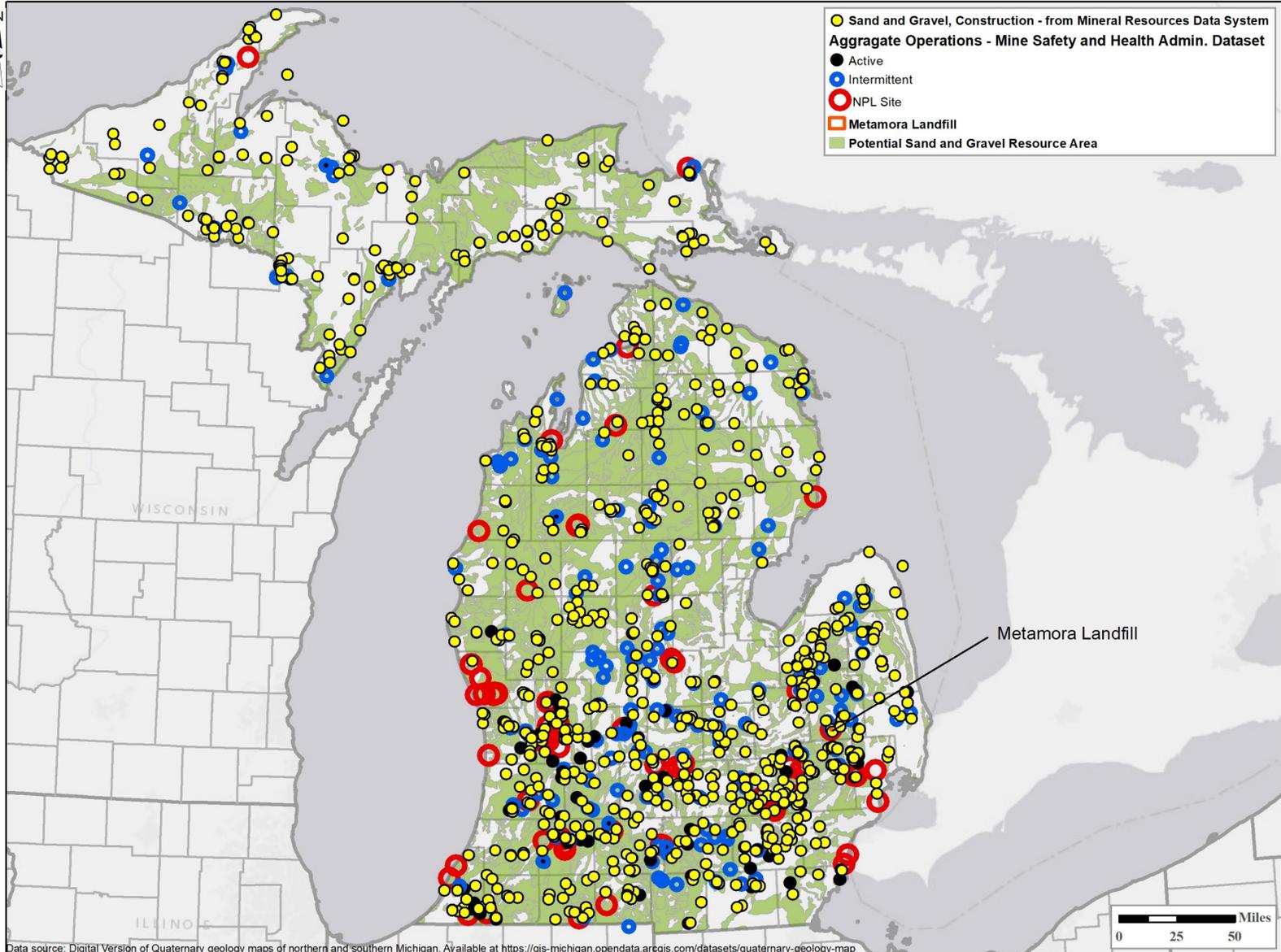
Sand/Gravel Operations and Resources in Michigan



- Sand and gravel aggregate **operations** are abundant and common in Michigan
- Potential sand and gravel **resources** are abundant in Michigan

The Mineral Resources Data System is a large database developed by the U.S. Geological Survey. Sand and gravel pits are shown for this dataset.
The Mine Safety and Health Administration Dataset shows aggregate operations classified as active, intermittent, or abandoned.
The Potential Sand and Gravel Resource Areas are interpreted from the Quaternary Geology maps and include deposits classified as Glacial outwash sand and gravel and postglacial alluvium, Ice-contact outwash sand and gravel; Lacustrine sand and gravel; End moraines of coarse textured till; and End moraines of medium textured till.

Sand/Gravel Operations and Resources and NPL Sites



Superfund sites in Michigan are distributed throughout areas that also contain gravel deposits.

Source – NPL Sites: U.S. EPA. <https://semspub.epa.gov/work/HQ/201272.pdf>

The Mineral Resources Data System is a large database developed by the U.S. Geological Survey. Sand and gravel pits are shown for this dataset. The Mine Safety and Health Administration Dataset shows aggregate operations classified as active, intermittent, or abandoned. The Potential Sand and Gravel Resource Areas are interpreted from the Quaternary Geology maps and include deposits classified as Glacial outwash sand and gravel and postglacial alluvium, Ice-contact outwash sand and gravel; Lacustrine sand and gravel; End moraines of coarse textured till; and End moraines of medium textured till.

Data source: Digital Version of Quaternary geology maps of northern and southern Michigan. Available at <https://gis-michigan.opendata.arcgis.com/datasets/quaternary-geology-map>
Data source: <https://a1web.msha.gov/OpenGovernment/Data/OGIMSHA.asp> showing sand and gravel operations in Michigan
Data source: <https://mrd.data.usgs.gov/mrds/package.php> Data from the Mineral Resources Data system developed by the USGS

OVERVIEW OF CONTAMINATION SITES IN MICHIGAN

1. Michigan has thousands of underfunded and unaddressed contamination sites.

- As of 2018, the Michigan DEQ (now EGLE) had identified 266 priority sites for remediation through its Environmental Cleanup and Redevelopment Program (“ECRP”) – all of which were unfunded, on funding hold, or insufficiently funded.¹ ECRP sites are those where the EGLE Remediation and Redevelopment Division “initiates and oversees state-funded cleanup actions . . . when there are no financially viable liable person(s), or where the liable person(s) refuses to act in a timely manner and immediate action is needed.”²
- DEQ has no ongoing cleanup efforts at 245 of the 266 priority sites due to funding challenges. A 2018 audit of the Clean Michigan Initiative (“CMI”) Environmental Protection Programs reported that DEQ “did not have CMI funds available to begin cleanup at the remaining project sites that it had identified,” and that “at the current CMI funding level, DEQ will not have the needed funds to continue maintenance and monitoring after fiscal year 2018.”³
- DEQ identified **6,725** other contaminated ECRP sites, in addition to the 266 priority sites, where the agency had not performed any evaluation beyond an intake assessment.⁴ The 2018 audit concluded that “[w]ithout additional funding, contaminated soil and water sites known to DEQ as posing a health risk to humans and the environment will go untreated.”⁵
- PFAS contamination in Michigan has reached crisis proportions. 148 PFAS sites have been identified so far, and EGLE reports there could be more than **11,300 sites in the state**.⁶

¹ Office of the Auditor General, *Performance Audit Report, Clean Michigan Initiative Environmental Protection Programs, Department of Environmental Quality* (December 2018), pp 13-14, available at <https://audgen.michigan.gov/wp-content/uploads/2018/12/r761021718-0077.pdf>.

² Michigan Department of Environment, Great Lakes, and Energy, *Fiscal Year 2019 State Environmental Cleanup Programs Report* (March 2020), p 11, available at <https://www.michigan.gov/documents/egle/2019 - 216 Consolidated Report 688965 7.pdf>.

This report also noted that despite making progress on cleanups in Michigan, “there are still thousands of sites to be addressed that need additional funding.” *Id.* at 10.

³ Office of the Auditor General, *Performance Audit Report*, p 14.

⁴ *Id.* This number does not include three unfunded Superfund sites in Michigan: Ten-Mile Drain in St. Clair Shores, the Velsicol Burn Pit site in St. Louis, and the Tar Lake site in Mancelona Township. As of August 2018, there were 74 total underfunded CMI-eligible Superfund Program sites in Michigan. *Id.* at 31.

⁵ *Id.* at 14.

⁶ Michigan PFAS Action Response Team (MPART), *Michigan PFAS Sites*

2. Only the most severely contaminated sites are elevated to federal attention for potential inclusion on the Superfund National Priorities List. While state regulations must be taken into account when selecting the remedy, USEPA ultimately has the final say over whether those standards apply.

- A “Superfund” designation allows the federal government to mobilize its resources to clean up contaminated sites and recover the costs of doing so from responsible parties. State, tribal, and local governments may also lead cleanup operations using federal funding.
- However, only sites that score 28.5 or above on the Hazard Ranking System are placed on the list of Superfund sites that are eligible for federal funding to pay for long-term cleanup.⁷ Even when a site is contaminated enough to qualify for the NPL, it is subject to a lengthy decision-making process before the cleanup begins (except in case of emergency), including a 60-day notice and comment period in the Federal Register before placement on the list.⁸

3. Contamination is often only addressed when it becomes a crisis situation discovered by local residents – even when the state is aware of the problem. Local oversight is critical for environmental protection in Michigan. Even when the state or federal governments are involved, successful remediation requires constant vigilance by local governments.

- As a recent example, Wolverine World Wide and its predecessor company contaminated drinking water in parts of Kent County, Michigan with tannery waste. The State of Michigan and USEPA have been aware of contamination issues stemming from Wolverine’s activities since at least 2010.⁹ However, EGLE only began addressing PFAS contamination in residential

<https://mdeq.maps.arcgis.com/apps/webappviewer/index.html?id=36c48f4a7d144c21a79291ba280cf50b> (accessed October 20, 2020); Matheny, *PFAS contamination is Michigan's biggest environmental crisis in 40 years*, Detroit Free Press (April 26, 2019), available at <https://www.freep.com/in-depth/news/local/michigan/2019/04/25/pfas-contamination-michigan-crisis/3365301002/>.

⁷ USEPA, *Superfund Site Assessment Process*, <https://www.epa.gov/superfund/superfund-site-assessment-process>.

⁸ USEPA, *Superfund Public Comment Process*, <https://www.epa.gov/superfund/public-comment-process>.

⁹ USEPA Enforcement Action Memorandum - Determination of Threat to Public Health and the Environment at the Wolverine Worldwide Tannery and House Street Disposal Site, Rockford and Plainfield Township, Kent County, Michigan (Site ID # C593), available at https://www.epa.gov/sites/production/files/2018-01/documents/wolverine_action_memo_01-10-2018.pdf.

drinking water wells when “a concerned citizens group brought the former House Street disposal location to EGLE’s attention on January 24, 2017.”¹⁰

- Even when there is the political will to hold responsible parties accountable, concrete action can take years to occur. For example, former Governor Snyder instructed the Attorney General to sue 3M for contributing to Michigan’s PFAS contamination in 2018, but suit was not filed until January of 2020.¹¹
- Cleanup action can also slow to a standstill when multiple governmental entities dispute jurisdiction. For example, PFAS contamination linked to the former Wurtsmith Air Force Base was discovered in Oscoda, Michigan in 2010. DEQ and the Air Force disputed the extent and scope of the remediation for years while the contamination plume continued to emanate from the former base and impact residential water supplies and fish.¹² DEQ even went as far as to send a Violation Notice to the Air Force alleging that the Air Force was in violation of Part 31 and Part 201 standards for discharges of venting groundwater,¹³ to which the Air Force argued it was immune under the Superfund law.¹⁴ The Air Force only began the cleanup process in August 2020 after urging by local officials and state lawmakers.¹⁵

¹⁰ Michigan PFAS Action Response Team, 2017 Investigation Timeline, available at https://www.michigan.gov/pfasresponse/0,9038,7-365-86511_82704_83030-502302--,00.html.

¹¹ Malewitz and Beggin, Bridge Michigan (November 18, 2019), available at <https://www.bridgemi.com/michigan-environment-watch/letter-suggests-bill-schuette-shrugged-request-sue-3m-over-pfas>.

Complaint, January 14, 2020, available at https://www.michigan.gov/documents/ag/Complaint_2020-01-14_final_678329_7.pdf.

¹² Notice of Invocation of Dispute Resolution Concerning the Former Wurtsmith United States Air Force Base (WAFB) and Response to Impacts to Drinking Water from [PFAS] (December 14, 2017), available at https://www.michigan.gov/documents/som/Letter_to_AFCEC_Marrs_from_DEQ_Shirey_dated_121417_608968_7.pdf.

¹³ Department of Environmental Quality Violation Notice No. VN-008900 (October 19, 2018), available at https://www.michigan.gov/documents/pfasresponse/Letter_from_DEQ_Seidel_to_USAF_Marrs_dated_101918_648332_7.pdf.

¹⁴ December 7, 2018 letter from Stephen TerMaat to Teresa Seidel, p 4, available at https://www.michigan.gov/documents/pfasresponse/Letter_from_USAF_Termaath_to_DEQ_Seidel_dated_120718_648045_7.pdf.

¹⁵ RI/IRA BCT Scoping Meeting Summary (August 20, 2020), available at https://www.michigan.gov/documents/pfasresponse/RI-IRA_BCT_Scoping_Meeting_Summary_703436_7.pdf.

Groundwater Flow and Gravel Mining

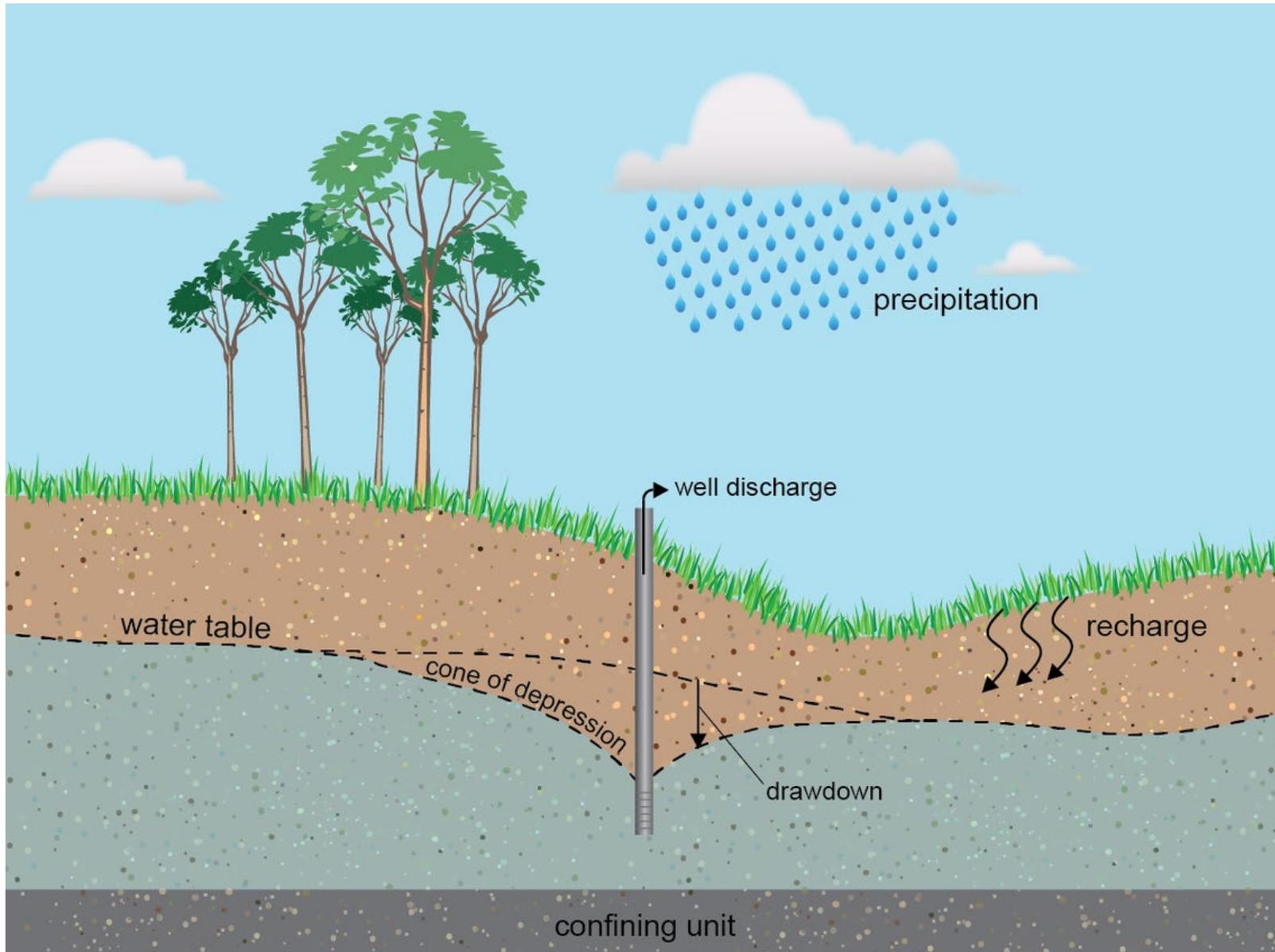
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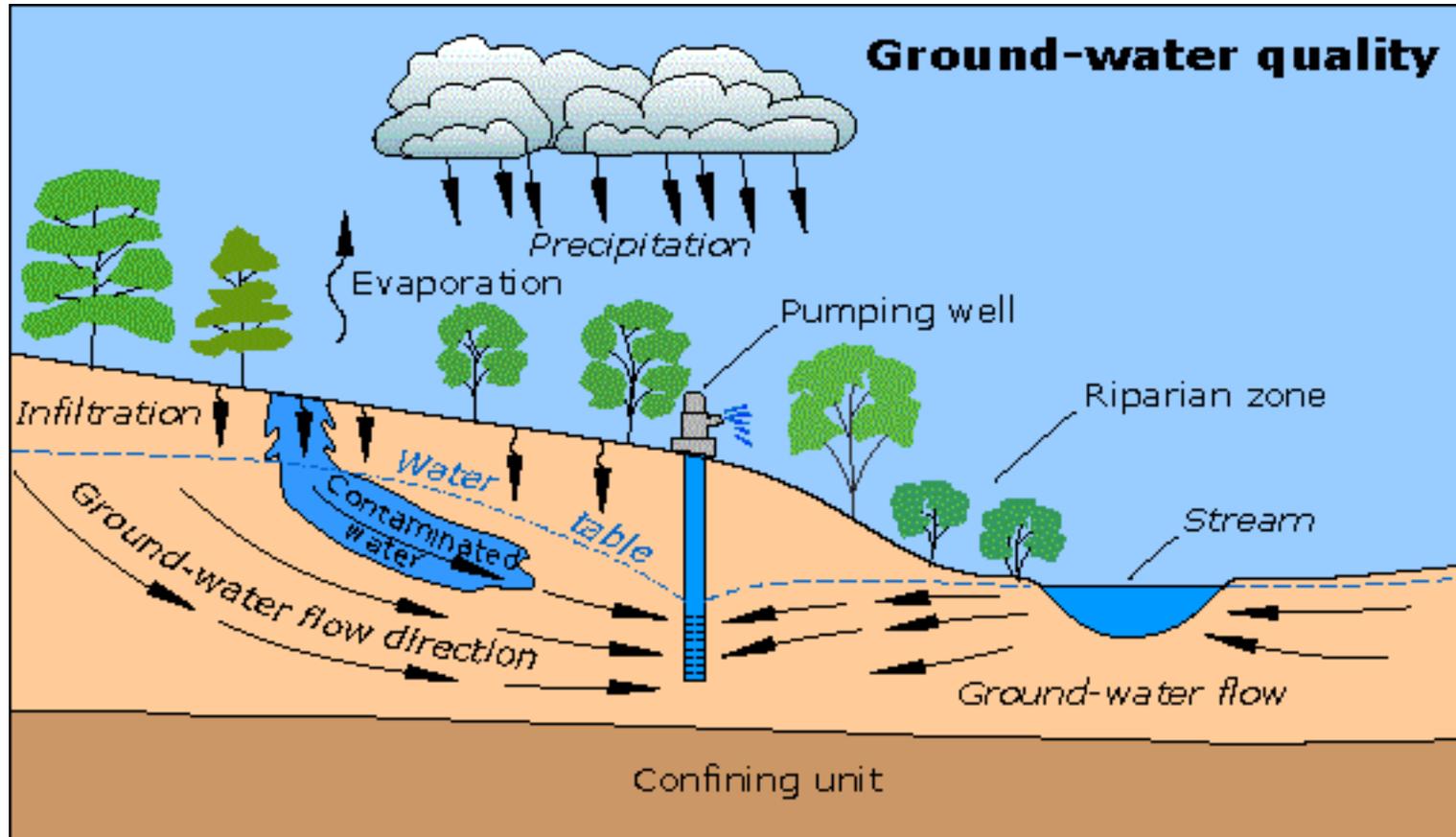
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Ground Water and Wells

- Ground water occurs in the saturated soil and rock below the water table.
- The level of the water table changes over time due to natural conditions and man-made factors, such as a pumping well.



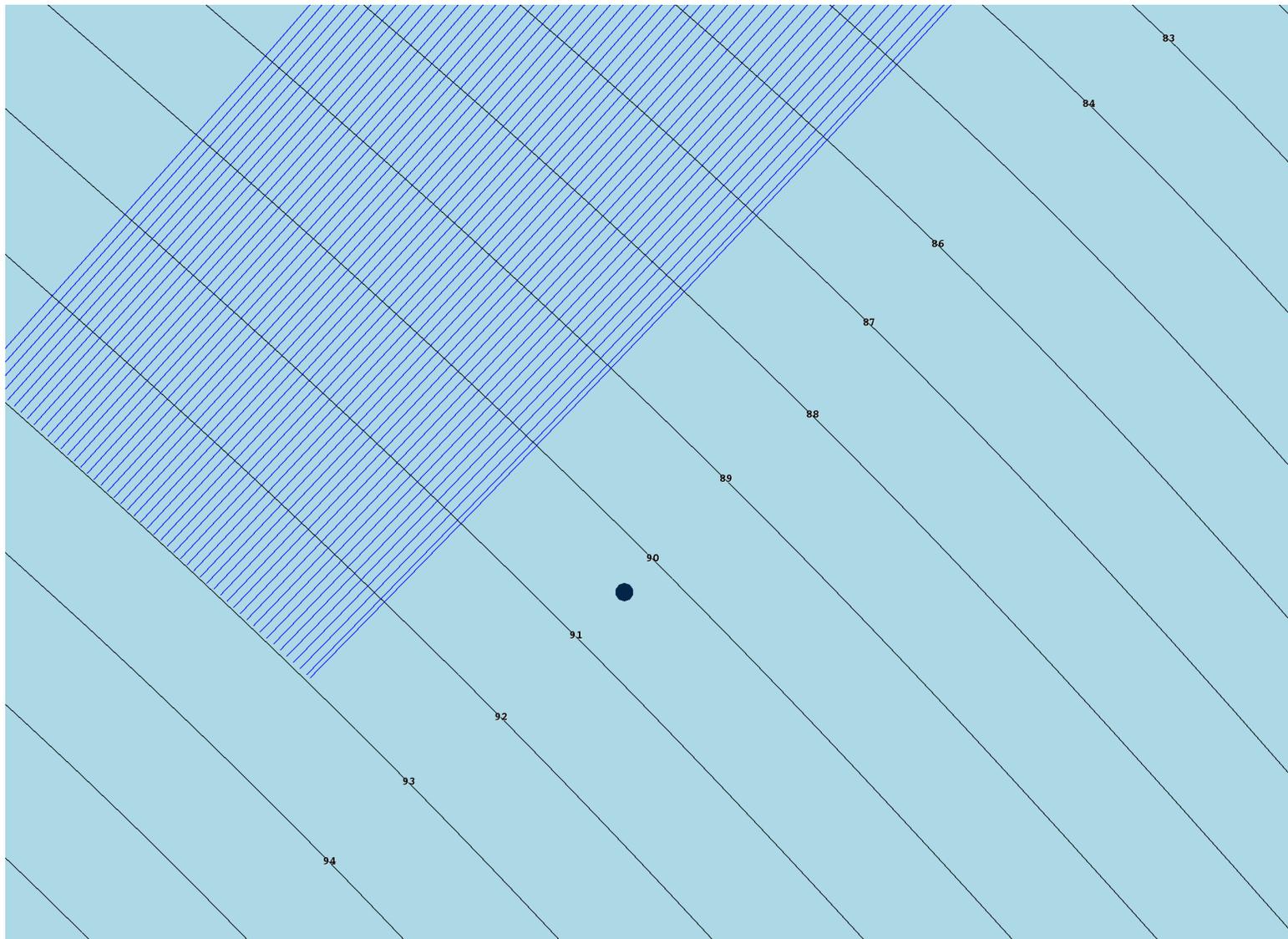
Pumping Well and Impact on Contaminant Migration



Pumping can alter the normal flow of groundwater and thereby change the migration of contaminants.

Before Pumping

- Groundwater flow is toward the northeast across the entire area

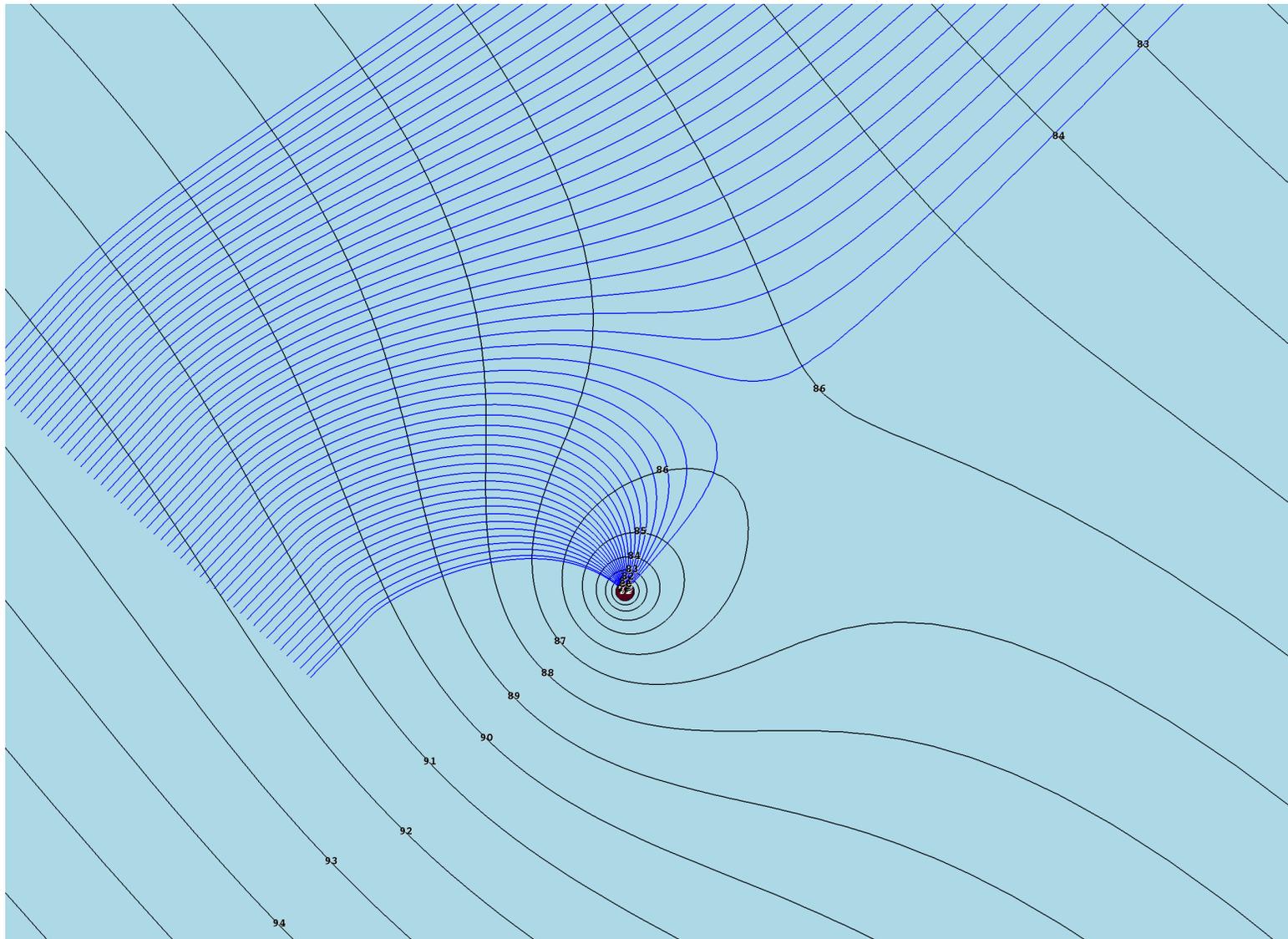


95 = water level contour elevation

 = ground water flow direction, perpendicular to water level contour

During Pumping

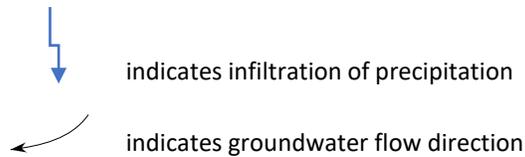
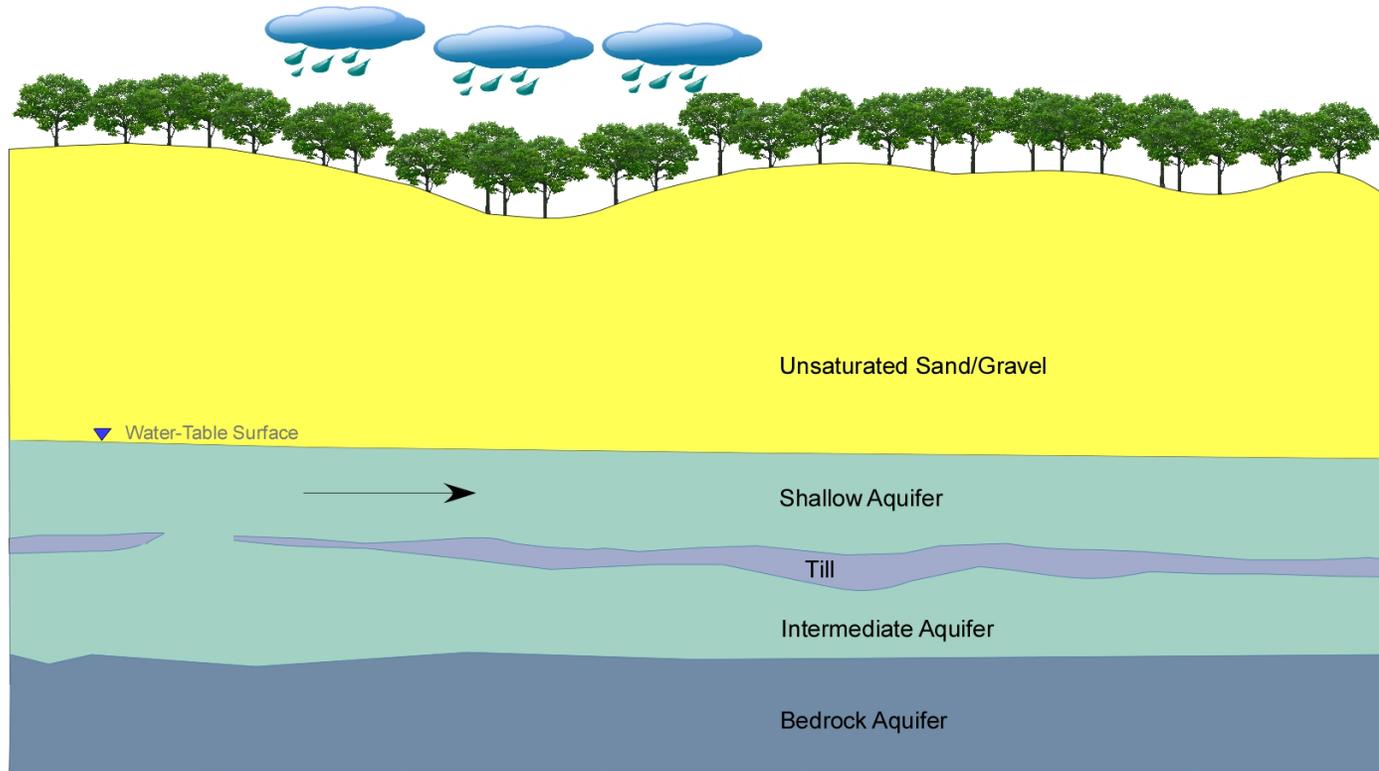
- Water levels are lowered across the area
- Ground water flow direction is altered
- The extent of these impacts depends on the pumping rate and characteristics of the aquifer



95 = water level contour elevation

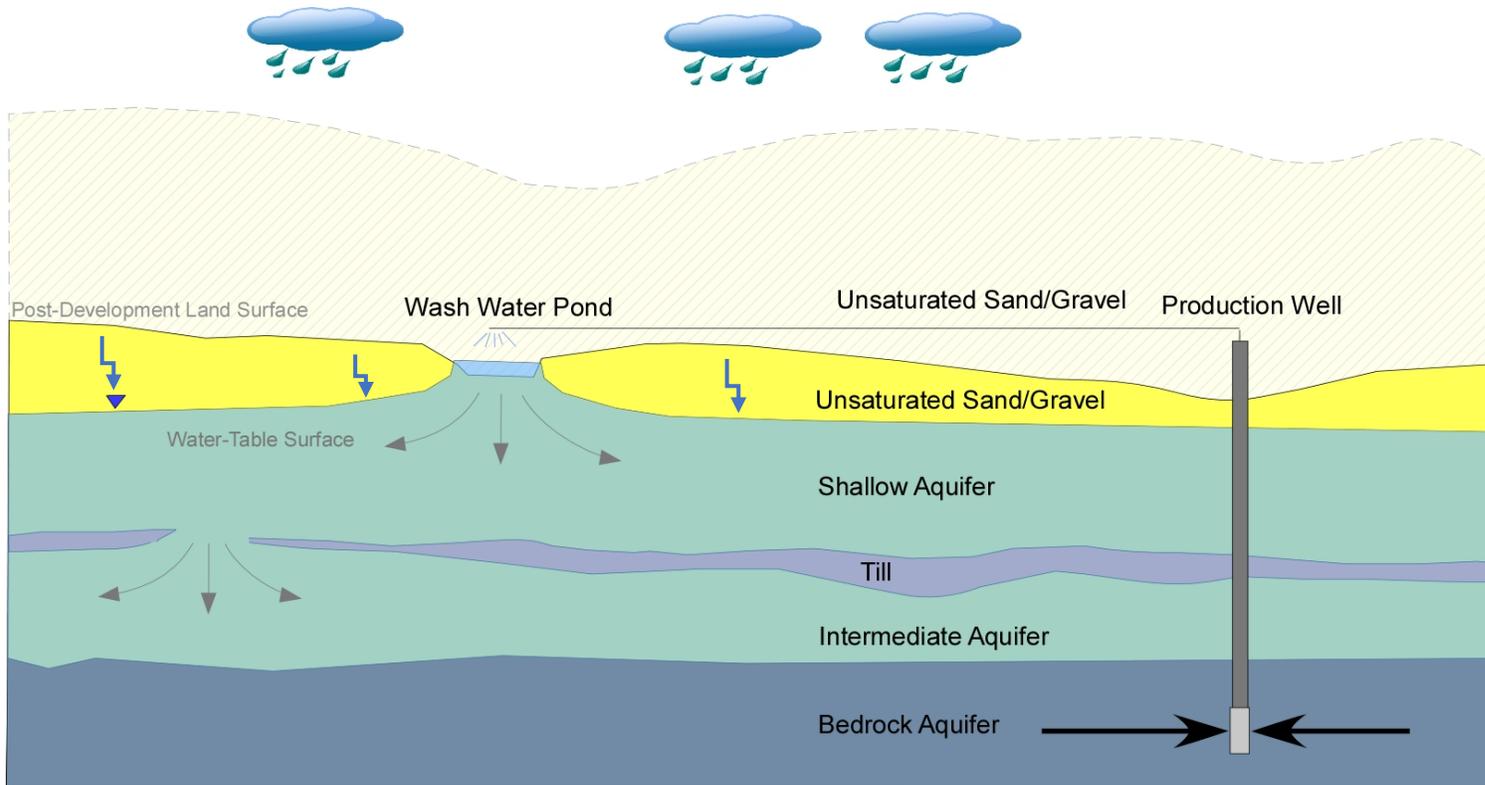
— = ground water flow direction, perpendicular to water level contour

Before Development of a Mining Site



- Groundwater recharge is the downward flow of water reaching the water table
- Precipitation, evapotranspiration, and surface runoff impact groundwater recharge
- Current understanding of groundwater levels and flow directions are based on current groundwater recharge
- Current plume delineation is based on current groundwater recharge

During Aggregate Operation



 indicates infiltration of precipitation
 indicates groundwater flow direction

- Groundwater recharge is increased by removing trees and vegetation, and from wash water ponds discharging to groundwater and causing local mounding of the water table.
- Changes in water levels can impact both shallow and intermediate aquifers where glacial till has been removed.
- Changes in water levels alter groundwater flow direction and gradient, which can alter the size and movement of a contamination plume.
- Water well in bedrock aquifer may also impact groundwater flow direction and movement of contaminants there.

Industry Claims vs. the Truth About Oversight of Gravel Mining

Claim	Truth
<p>Gravel mines are regulated by EGLE.</p>	<p>EGLE does not directly regulate gravel mining. Gravel mining may implicate individual subject matter areas that are regulated by EGLE, such as air and water, but the mining activity itself is not regulated, nor is the entire operation ever evaluated by any regulator other than local government.</p> <p>This checklist gives a brief overview of all the different kinds of permits EGLE administers, and air and water appear to be the only possible permits most gravel operators might ever have to get: https://www.michigan.gov/documents/egle/egle-tou-permits-checklist_678821_7.pdf.</p> <p>And if there's any question about the patchwork approach to groundwater regulation and what happens when contamination occurs, this list of resources confirms it: https://www.michigan.gov/documents/deq/deq-wb-dwehs-ciu-somcontamwebsites_299942_7.pdf.</p>
<p>Part 327 amendments in SB 849 would protect water from contamination.</p>	<p>Part 327 is concerned with water volumes and diversions of water from the Great Lakes basin, not safety. Under Part 327, water withdrawal registrations and large quantity water withdrawal permits evaluate whether the resource has the capacity to withstand the proposed use. EGLE does not ask whether the water is contaminated, as one can see from the permit application and instructions: https://www.michigan.gov/documents/egle/egle-wrd-wateruse-permitapp_658371_7.pdf.</p> <p>The sole permit standard that might touch on water quality is the requirement to provide an analysis of the "existing hydrological and hydrogeological conditions" and "potential effects on neighboring wells and the environment." However, the statute limits these impacts to measuring changes in fish populations and/or changes to flows and levels of surface water bodies. Changes in water quality, groundwater contamination migration pathways, etc. are not considered "impacts" under the statute.</p>

Industry Claims vs. the Truth About Oversight of Gravel Mining

Claim	Truth
EPA has oversight or would be involved on a site with contaminated water	Maybe. EGLE administers programs involving remediation and redevelopment of contaminated properties (Part 201 and Part 213). ELGE manages <i>some</i> portions of the Superfund program. If a contaminated site had not been designated a Superfund site (there are hundreds of Superfund sites in the state but thousands of contaminated sites that aren't Superfund), EPA would not likely be involved. https://www.michigan.gov/documents/deq/deq-ess-caap-manufguide-chap7_313424_7.pdf
EPA is involved with water issues at Metamora Superfund site.	True, as it relates to its oversight of the remediation of the Superfund site. However, private, individual household wells are not regulated by EPA. EPA's activities related to well sampling and groundwater in Metamora stem from its regulatory authority under CERCLA to hold to account the parties responsible for the contamination. https://www.michigan.gov/documents/egle/egle-wrd-wateruse-permitapp_658371_7.pdf
There are no very serious consequences that cannot be addressed.	Some sites are simply unsuited for mining uses. Example: Intersection of Maple City Hwy and Oakley Road, Inland Twp (Benzie County). Proposed mine is located off a seasonal road. Turnout onto Maple City Highway has blind curve in one direction and hill in the other, making it impossible to adequately evaluate oncoming traffic. Sight lines and stopping distances have been evaluated by an engineer as very inadequate Traffic regularly travels 65-70 mph along Maple City Highway. Unless the topography of the area is re-engineered, there is no way to avoid the VSC of serious risk of traffic accidents as slow, heavy gravel trains attempt to pull onto Maple City Highway.

Industry Claims vs. the Truth About Oversight of Gravel Mining

Additional background on drinking water oversight:

EGLE has primary enforcement authority in Michigan for the Federal Safe Drinking Water Act under the legislative authority of the Michigan Safe Drinking Water Act. As such, EGLE has regulatory oversight for all public water supplies, including approximately 1,400 community water supplies and 10,000 noncommunity water supplies. The program regulates the water well drilling industry. Michigan has nearly (1.12 million) households served by private wells, with approximately 15,000 domestic wells drilled each year. EGLE also investigates drinking water well contamination, and oversees remedial activities at sites of groundwater contamination affecting drinking water wells. EGLE contracts with local health departments to maintain a noncommunity water supply program in each county. Noncommunity water supply staff at EGLE supports the local health departments through training, technical support, and program evaluation.

https://www.michigan.gov/egle/0,9429,7-135-3313_3675---,00.html

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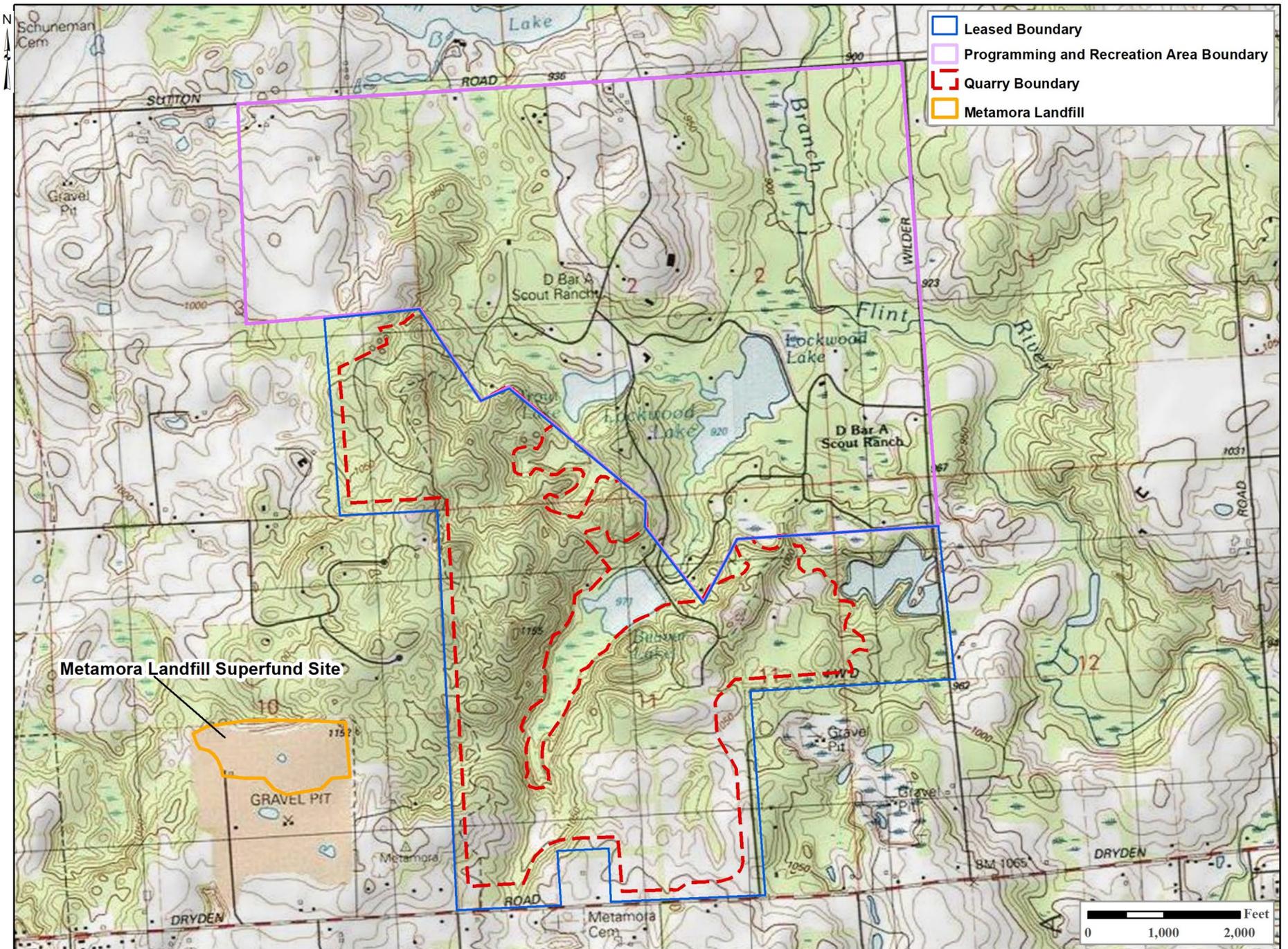
Metamora Landfill Contamination Update

October 27, 2020

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Topographic Map and Site Features

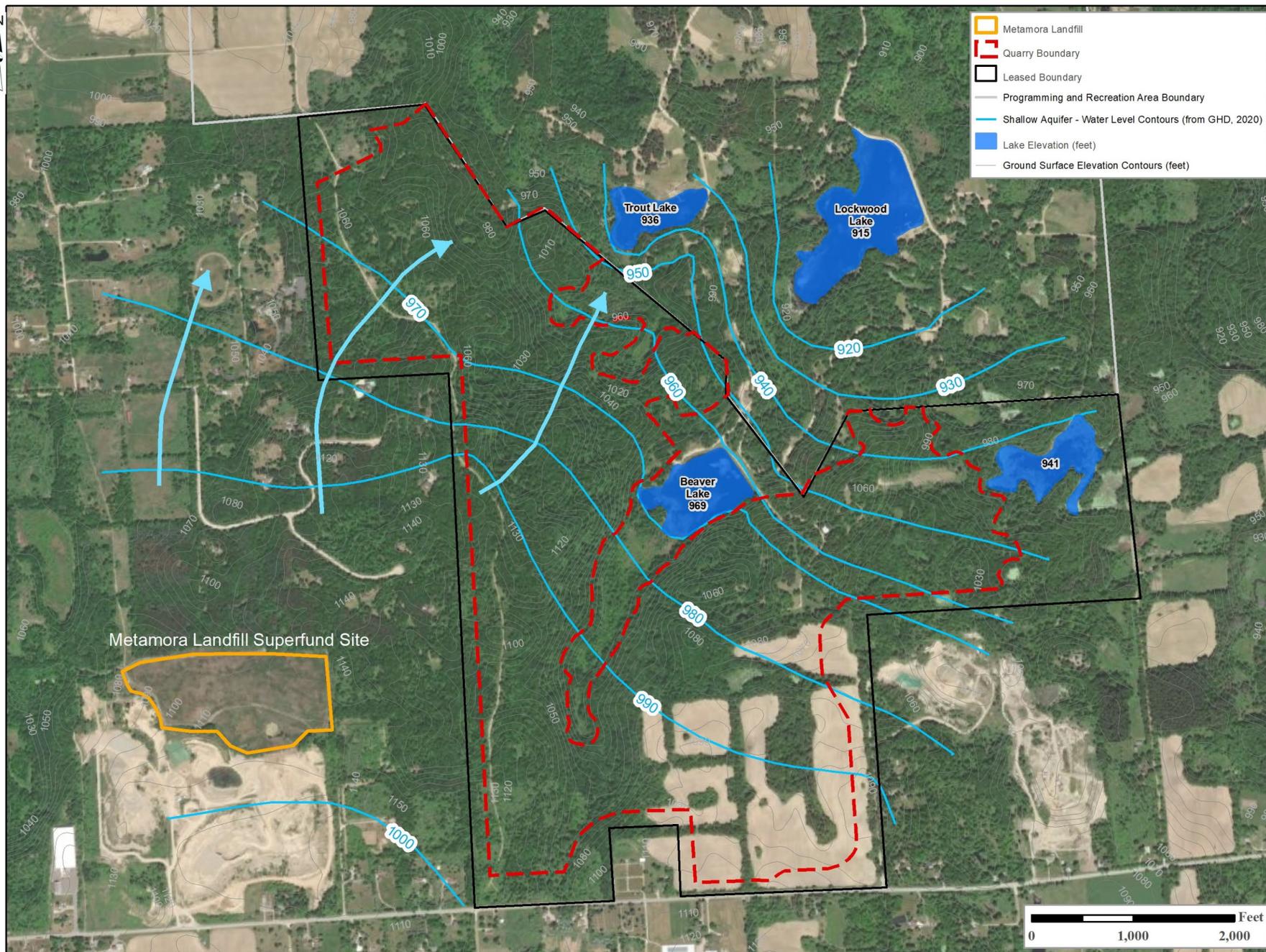
Groundwater in the shallow aquifer in the Leased Area discharges to the South Branch of the Flint River.

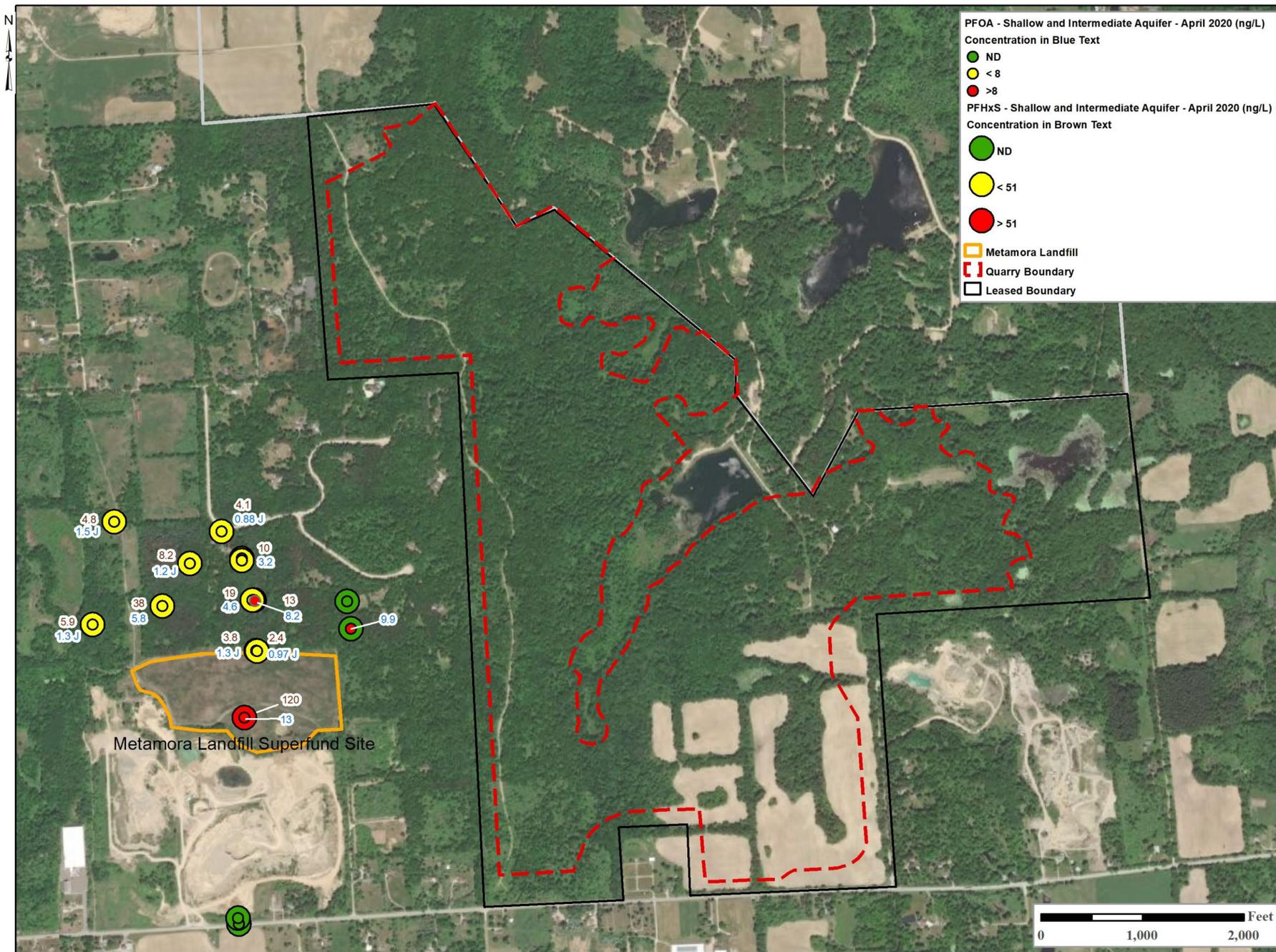
Groundwater Flow in Shallow Aquifer

- Direction of groundwater flow is toward the northeast and Trout and Lockwood Lakes

 = direction of groundwater flow

Note: Groundwater levels measured on February 17, 2020; Groundwater contours are based on GHD, 2020 (Letter from J. Vaillancourt to D. McCausland, Response to Agency Well Location Request Metamora Landfill Site, Michigan. June 2, 2020. Installation).



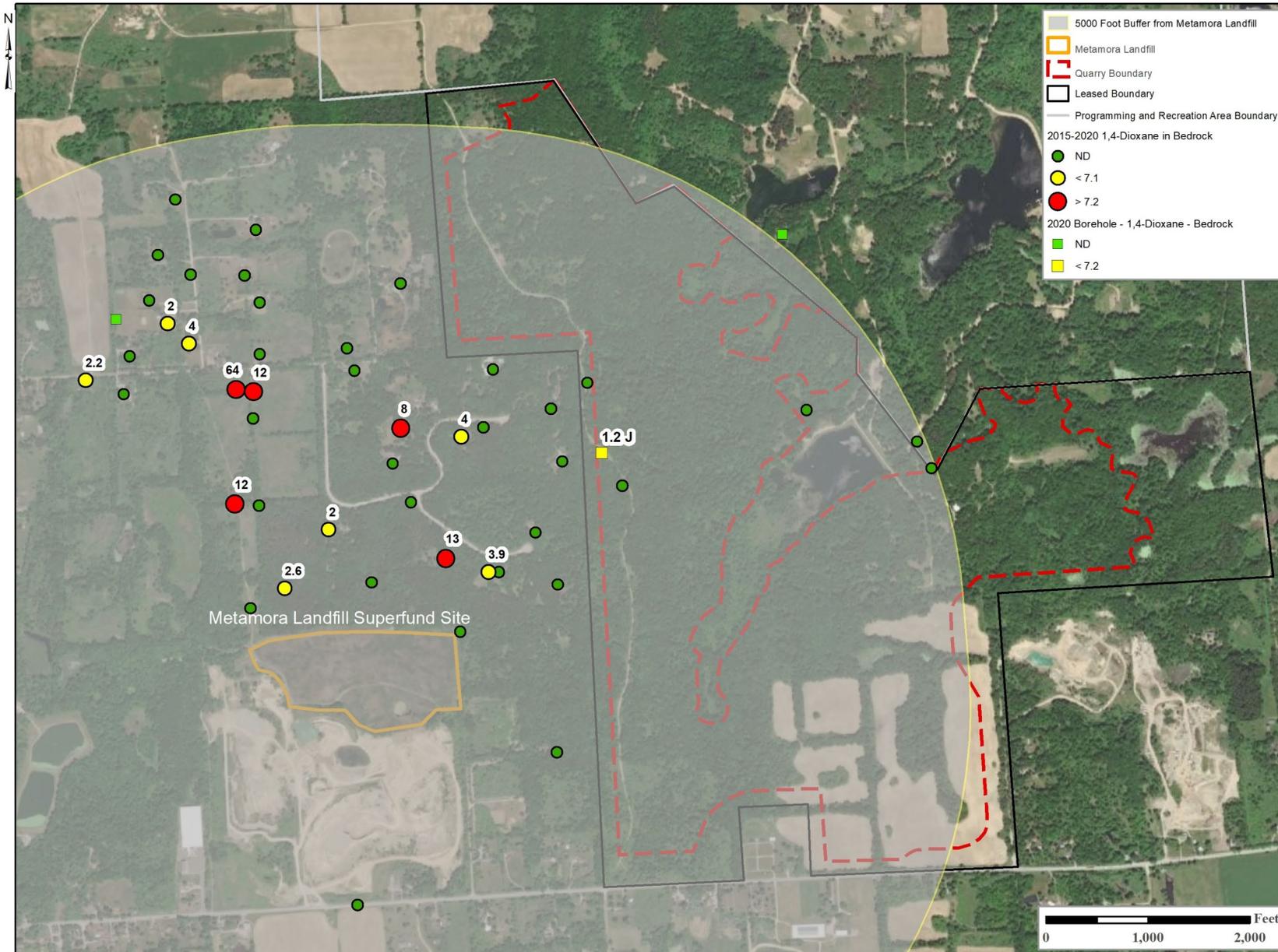


PFAS Compounds in the Shallow and Intermediate Aquifer

PFAS compounds have been detected in groundwater outside the landfill area.

These data are initial results. More investigation is expected.

Production Wells for Water Supply



- Levy plans to install a high capacity well in the bedrock aquifer to supply wash water for the operation.
- Levy states it will locate the well more than 5,000 feet from the landfill, but most of the mining area is within 5,000 feet of the landfill.
- 1,4-Dioxane has been detected in the bedrock aquifer near the mining area.
- The well could impact groundwater flow and contaminant migration in the bedrock aquifer.

Data source – 2015 to 2020 data from Figure 2.3 of June 2, 2020 Letter from GHD to Engineering Management, Inc.; 2020 Borehole data from August 3, 2020 and August 21, 2020 letter reports on VAS sampling results.