Lead Cable Investigation

June 30, 2023

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INTRODUCTION

The Environmental Defense Fund (EDF) seeks to understand the extent to which telecom and power cables running through rivers, streams, and lakes that serve as drinking water sources may have been constructed using lead pipe and which may now pose a public health risk that needs to be addressed. Marine Taxonomic Services, Ltd. (MTS) is a marine and aquatic consulting firm that has expertise and experience conducting environmental investigations in bodies of water. MTS shares EDF's interest in protecting public health should a risk be identified, and therefore, an interest in making any finding from its work publicly available.

Understanding potential sources of lead in drinking water is critical to the protection of public health. The Environmental Protection Agency (EPA) has established an action level of lead in drinking water. The action level is 15 micrograms per liter (ug/L) (CDC 2019). Lead is widely understood as a public health threat with neurological, reproductive, and hypertensive implications for impacted individuals (CDC 2019). The National Toxicology Program (CDC 2012) concluded that there was sufficient evidence for adverse health effects in children and adults at blood lead levels of less than 5 micrograms per deciliter (µg/dL) of blood (CDC 2012). However, no blood lead threshold for adverse health effects has been identified in children, and no BLL above zero is free of all risk (CDC 2019).

In 2022, the Wall Street Journal reached out to MTS as part of reporting for an article on cables. EDF contracted with MTS and funded an initial study to validate the locations of abandoned cables and perform environmental sampling at locations adjacent to the cables. MTS and the WSJ visited the cable locations that were identified by the WSJ. MTS, alongside WSJ reporters, investigated numerous locations in six regions across the U.S, where the WSJ provided permit records showing historical cable locations within rivers, streams, and lakes. Verification of permit records included determining if cables were present at those locations and visually assessing the composition of telecom and power cables. Screening samples of water, sediment, and soil in the immediate vicinity were collected and tested for lead. Samples from the surface of the lead cable were collected, when present, to confirm its identity.

METHODS

Six general regions were chosen for investigations. In order of investigation, these include the South (Louisiana), Midwest (Michigan), Northwest (Oregon and Idaho), Appalachia (Pennsylvania and West Virginia), Mid-Atlantic (New Jersey, and New York), and West (California).

The WSJ identified cable locations that had been permitted with various state and federal offices, resulting in sixteen states that were of interest to the project. The WSJ narrowed down thousands of records and identified specific communities where lead sheathed telecommunications cables were most likely to remain in place based on historical permits, NOAA navigational charts, and the presence of geographic indicators. This resulted in the nine priority states discussed within this report. With guidance from EDF, MTS and WSJ reporters visited these locations. See Figure 1 for an overview map of the nine states that were investigated. As the investigative team approached each location within the nine states, points of interest were identified, such as signs, manholes, utility poles with cables, lead splice box, or other indicators that would help to identify the presence of a lead sheathed cable. These were recorded as points of interest in the database. One location could contain multiple points of interest based on field observations. See Figure 2, for a generalized map of the points of interest where data was recorded for each of the nine priority states.

The project goal was to document the presence and condition of lead sheathed cables within the selected regions. Additionally, screened samples of water, sediment, soil, and cable were collected within and adjacent to water bodies where lead-containing cables were identified. The samples were provided to analytical laboratories to determine the lead content. WSJ selected the laboratory and paid for the analysis. While MTS was responsible for implementing the field investigations and sampling, MTS was not responsible for making any determinations relative to the source of the lead in any given sample.

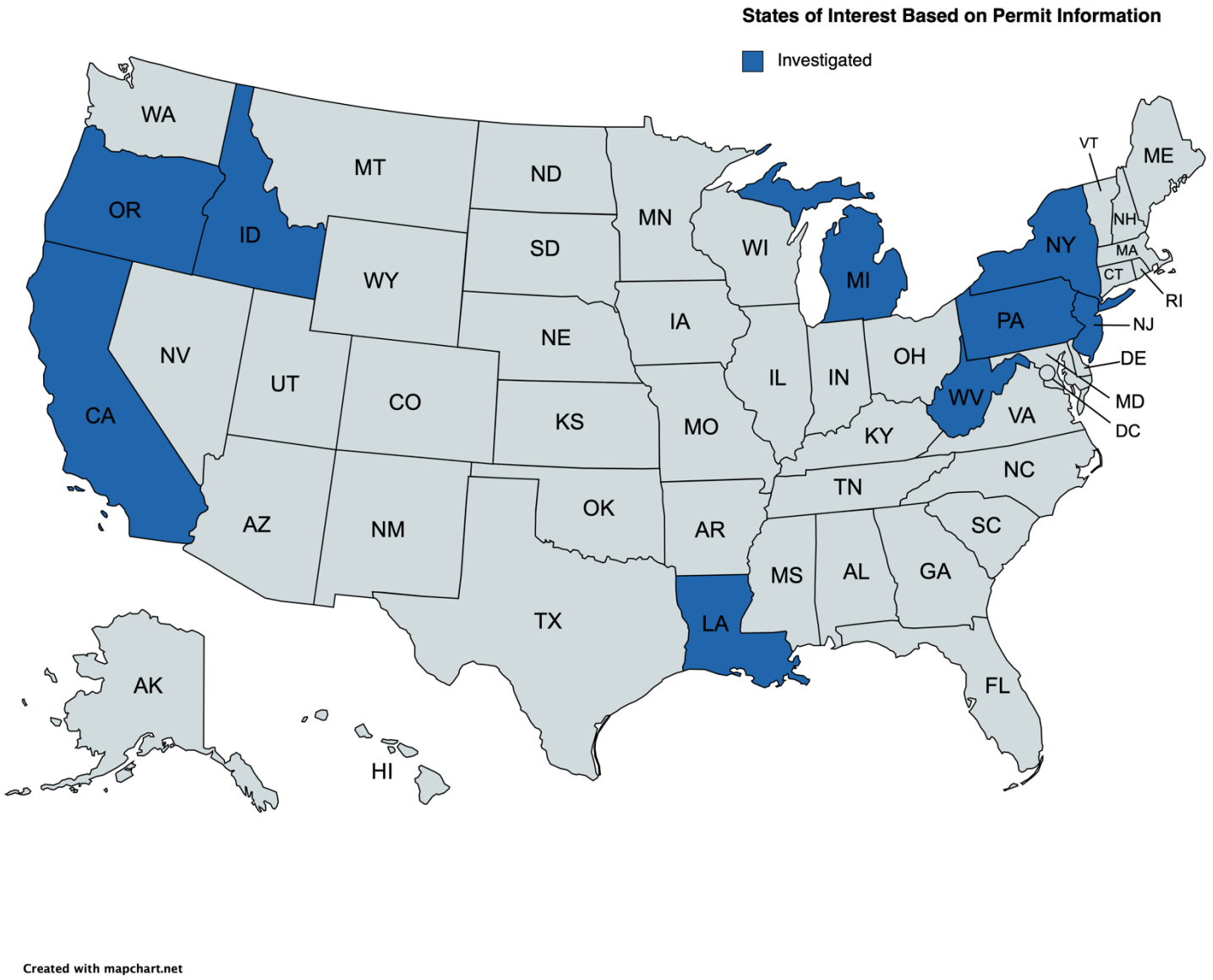


Figure 1. Overview map of states based on historical permit data collected and provided by the Wall Street Journal.

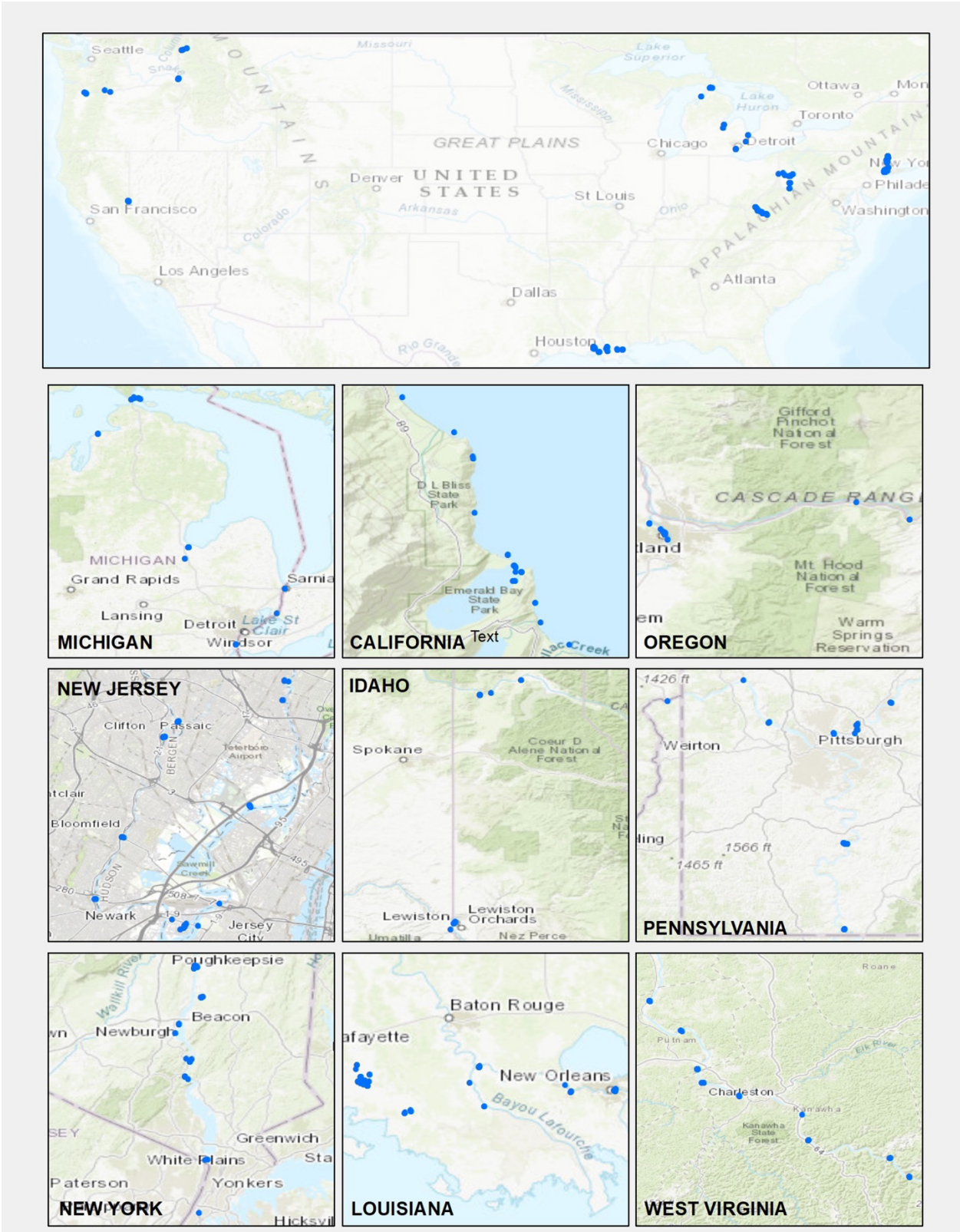


Figure 2 Overview map of the generalized points of interest investigated across the nine states selected by the Wall Street Journal, Marine Taxonomic Services, and Below the Blue 501(c)3. Project Funded by the Environmental Defense Fund. Map and data points provided by Below the Blue. June 2023.

MTS traveled to the agreed upon locations and surrounding communities with WSJ reporters to investigate the permit locations for presence of lead sheathed cables. Documentation as to the presence and condition of the lead sheathed cables was collected at each identified location using Fulcrum, data management software provided by Below the Blue 501(c)3, a not-for-profit organization.

MTS collected samples as identified under methods for both diver-assisted collections and surface collections. Sampling locations were chosen in part by their likelihood to show high lead levels. Chain of Custody (COC) forms were created for each sampling region and then shipped with samples via FedEx to Pace Analytical Laboratories (Pace) out of Huntersville, NC. The analytical lab was arranged and paid for by the WSJ.

MTS collected samples of water, soil, and other materials with the objective of screening for lead. Additional samples would need to be collected to assess any associated risks in a subsequent effort. Below is a summary of the specific sample collection methods.

Water Sample Collection Methods

Diver Methods

In cases where water samples were collected near cables and the cable was too deep to be accessed from the surface, divers collected water samples with a new plastic syringe. Once the sampling location was identified, the dive tender/deckhand put on a pair of new nitrile gloves and the diver put on two pairs of gloves, one on top of the other. The dive tender/deckhand removed the plastic syringe from its sealed wrapper. The diver then removed a pair of gloves, ensuring there was no contamination from contact with other items, such as the boat, between the time of entering the water and locating the cable and returning to the vessel or shore for the sampling syringe.

After receiving the unwrapped syringe from the dive tender/deckhand, the diver would descend to relocate the cable. The diver approached the sampling location slowly and with careful buoyancy control to avoid disturbing the bottom when approaching the sampling location. The diver then collected water one centimeter away from the cable by drawing on the syringe. The diver used a gloved finger to then cover the tip of the syringe and surfaced. At the surface, the syringe was provided to the dive tender/deckhand. If the dive tender/deckhand contacted any other items between the time of handing the syringe to the diver, the dive tender/deckhand would change gloves. Once the syringe was provided to the dive tender/deckhand, the dive tender/deckhand opened a new plastic container as provided by the analytical laboratory and emptied the contents of the syringe into the container. The lid of the container was held while transferring the sample. The lid was then replaced, and the sample was stored with other samples collected on the same day in a cooler.

Surface Collection Methods

Some samples were collected from the surface of water bodies. In these instances, nitrile gloves were put on by the sampling team. One team member opened the plastic container provided by the analytical laboratory and removed the lid. The lid was held during sampling as opposed to being set down. The container was then inverted and placed under water so it would fill with water when turned upside down to release the air. When the container was within one centimeter from the cable, the team member turned the opening toward the surface and brought out of the water. The lid was then replaced, and the sample put into a cooler for storage. All coolers used for storage were cleaned with Liquinox and rinsed with deionized water prior to being used to store samples. During sampling from shore, care was taken to minimize sediment disturbance. Gloves were changed whenever multiple samples were collected.

Sediment and Soil Collection Methods

Diver Methods

In cases where sediment samples were collected underwater, divers collected samples with a stainless scoop at locations touching and up to 15 centimeters away from the cable and at various locations away from the cable.

Once the sampling location was identified, the dive tender/deckhand put on a pair of new nitrile gloves and the divers put on two pairs of gloves, one on top of the other. After locating the cable and sampling site the diver then removed a pair of gloves, to ensure there was no contamination from contact with other items, such as the boat, between the time of entering the water and locating the cable and returning to the vessel or shore for the equipment. The dive tender/deckhand handed the divers everything needed for sampling once they were ready to collect the actual sample.

One team member/diver opened the plastic Ziplock bag and held it open underwater for the sampling diver who used a site-washed (using Liquinox) stainless scoop to fill the bag with sampled sediment. The diver scooped sediment very slowly and moved the scoop very slowly to the bag, so no sediment was washed away during the process. The sample bag was sealed underwater, and everything was brought to the surface and handed to dive tender/deckhand on a vessel or shore. The bag was labeled externally, doubled bagged, and then the sample was placed into a cooler for storage. All coolers used for storage were cleaned with Liquinox and rinsed with deionized water prior to being used to store samples. Gloves were changed whenever multiple samples were collected.

Surface Collection Methods

Sediment and soil samples were collected using a stainless-steel scoop at locations touching and up to 15 centimeters away from the cable and at various locations away from the cable. In these instances, nitrile gloves were put on by the sampling team. One team member opened the plastic Ziplock bag and held it open for the sampler who used a site-washed (using Liquinox) stainless scoop to fill the bag with sampled sediment. The sample was labeled externally, doubled bagged, and then the sample was placed into a cooler for storage. All coolers used for storage were cleaned with Liquinox and rinsed with deionized water prior to being used to store samples. Gloves were changed whenever multiple samples were collected.

Cable Collection Methods

In addition to water and sediment samples, samples were taken from the investigated cables directly to determine if the material was lead. These samples were collected using a stainless-steel scraper at locations where cables were deemed abandoned. Cables were determined to be abandoned in place through visual methods such as identifying severed ends or observing signs of obvious disrepair.

Diver Methods

When collected in the water, nitrile gloves were put on by the sampling team. Divers collected samples with a stainless scraper directly from the lead sheathing around the cables.

Once the sampling location was identified, the dive tender/deckhand put on a pair of new nitrile gloves and the divers put on two pairs of gloves, one on top of the other. After locating the cable and sampling site the diver then removed a pair of gloves to ensure there was no contamination from contact with other items, such as the boat, between the time of entering the water, locating the cable, and returning to the vessel or shore for the equipment. The dive tender/deckhand handed the divers everything needed for sampling once they were ready to collect the actual sample.

One team member/diver opened the plastic Ziplock bag and held it open directly next to the cable underwater for the sampling diver who used a site-washed stainless scraper to scrap a few small pieces of lead from the cable sheathing into the bag. The sample bag was sealed underwater, and everything was brought to the surface and handed to staff on a vessel or shore. The bag was labeled externally, doubled bagged, and then the sample was placed into a cooler for storage. All coolers used for storage were cleaned with Liquinox and rinsed with deionized water prior to being used to store samples. Gloves were changed whenever multiple samples were collected.

Surface Collection Methods

When collected on land, nitrile gloves were put on by the sampling team. One team member opened the plastic Ziplock bag and held it open for the sampler who used a stainless scraper to put a few scraps directly from the cable into the bag. The sample was labeled externally, doubled bagged, and then the sample was placed into a cooler for storage. All coolers used for storage were cleaned with Liquinox and rinsed with deionized water prior to being used to store samples. Gloves were changed whenever multiple samples were collected.

TYPICAL CABLE COMPOSITION

A typical telecom line sheathed in a lead pipe consists of numerous layers of varying substances. From the 1800's into the 1960's, they typically were constructed as follows:

The outer most layer appears to be a petroleum-based tar-impregnated fiber or asphaltic material. The layer below that is composed of ¼" thick steel rods twisted around the cable core. There are typically numerous layers of tar-impregnated twine or asphaltic material under the steel rods. The core is separated from these outer protective layers with a lead pipe that is roughly 1/5" thick. Inside the lead pipe, the core is made up of copper wire pairs wrapped in paper insulation. Each of the paper-wrapped wire pairs is bundled with a string.

MTS dissected a piece of lead-sheathed 24 pair telecom cable from Emerald Bay in Lake Tahoe to determine the above description and evaluated the relative composition per foot of cable. The lead pipe in this cable was 0.188-inch thick. The below table provides the composition and extrapolates the weight of the various materials per mile (Table 1).

Table 1. Typical Cable composition in pounds per foot and per mile of cable.

Material	pounds/foot	pounds/mile
Petroleum-based, tar-impregnated fiber or twine	0.71	3,724.9
Steel	4.15	21,916.6
Lead	3.39	17,898.3
Paper	0.21	1,110.0
String	0.01	27.9
Copper	0.77	4,078.8

Lead sheathed power cables had similar construction. The primary difference is that the copper wires inside the lead pipe are insulated with a rubber-like material. All telecom lines were continuously charged with air internally to prevent water intrusion and facilitate finding cracks in the lead pipe. If a system had cracks and was failing while pressurized, air would leak from that location and be visible in the water column or from the surface. Abandoned cables that do not have operating compressed air systems are typically inundated with water.

RESULTS

Each of the sections below provide the results of site visits within each of the six regions that were targeted for investigation. In order of investigation, those regions include the South (Louisiana), Midwest (Michigan), Northwest (Oregon and Idaho), Appalachia (Pennsylvania and West Virginia), Mid-Atlantic (New Jersey, and New York), and West (California).

South Region

Louisiana

Louisiana was the only state investigated within the South region. MTS visited a total of twenty-six different locations across the state of Louisiana. A total of sixty-four points of interest containing GPS data were investigated and recorded while screening the twenty-six locations. The locations generally occurred along the Atchafalaya River, Bayou Boeuf, Bayou Lafourche, Bayou Teche and Mississippi River. These locations were visited over a period of three field days from June 3-5, 2022.

Louisiana had the most data points collected, only a few are highlighted in this summary report as organized by water body below. A complete table of locations and identified points of interest are provided within each of the daily data collection reports referenced below. The daily reports are provided electronically with this document. The daily data collection reports also help to understand the initial naming conventions used for the points of interest highlighted.

Eighteen points of interest were recorded where visible lead sheathed cables were noted; of those eighteen points, six points contained lead sheathed power cables. Eight points of interest were recorded with Bell Systems manholes with a total of ten manholes and two possible vault locations. The remaining thirty-six points of interest consisted of water intake locations, signs, and old telephone poles. Various types of insignia mentioned above indicate that Southern Bell Telephone, South Central, AT&T and Bell Systems are the dominant companies represented in the area. Additional details are provided for each of the areas listed below. Coordinates for each site and point of interest can be found in the following documents:

20220603_Louisiana Data Collection – Final
20220604_Louisiana Data Collection – Final
20220605_Louisiana Data Collection – Final

Bayou Lafourche

Two locations with three points of interest along the Bayou Lafourche contained old telephone poles, the remnants of Bell Cable signs, ground markers and plastic corrugated hose where cables may have been (Figure 3(A-B)). While there were no visible cables found at these locations, there was some evidence suggesting these old cables may still be in use. However, we arrived at this location at night and the area was heavily overgrown. The investigative team was only able to survey two points on the Bayou Lafourche due to time.

Bayou Teche

Twelve points of interest along the Bayou Teche contained visible lead sheathed cables, with both power and telecommunication cables at various locations. BT 1.1 was the first point of interest at this location; five feet of steel wire were observed protruding from the ground with a portion of damaged, bare lead sheathed cable at the base (Figure 4(C)). Further along the Bayou Teche, BT 16.1 illustrated a sort of debris field that would end up characterizing much of the area, a combination of new and old materials left in varying conditions and states of use (Figure 4(D)). BT 17.1 contained four lead sheathed cables underneath the bridge: two power cables and one telecommunication cable. Sections of bare lead were observed near the water's surface as seen in Figure 4(E). Along the E. Bridge Street bridge in the historic district of St. Martinville, LA, BT 24.1 contained the first leaded splice box observed. There are two lead sheathed cables coming from the bottom of the splice box, leading into the ground as seen in Figure 4(F). This splice box was located along the sidewalk going into town and a larger picture view can be seen in Figure 5(G). This location also had a Bell Systems manhole. In Franklin, LA at Location BT 26.2, another exposed lead splice box and set of cables were observed in a small muddy duck pond in a public park with direct drainage into the Bayou Teche (Figure 5(H)).

Mississippi River

The team worked along the Mississippi River into New Orleans, where there is a mix of revitalization, modified shorelines, and areas of abandoned debris. MISS 2.1 is near the Poydras Station, an area revitalized for tourism. This point of interest contained three Bell Systems manholes and a vault which is likely a hub and splice location for multiple cables. The door behind the manholes seen in Figure 6(I) is marked with an AT&T sign suggesting it is the utility building where cables in the area would converge. Due to the heavy revitalization in and around the boardwalk area, this site requires boat access to identify whether the submarine cables leading into the vault remain in place and in use. MISS 3.1 is an area along a biking path and greenway and is also an abandoned cable location (Figure 6(J) and Figure 7(K)). There is a homeless encampment adjacent to this cable location. One local, who has lived there for nearly a decade said that he has seen people cut pieces of the cable at extreme low water to sell as scrap metal. There is visible evidence of this seen in Figure 7(K-L). While this site is accessible from land, it would require a boat and diving equipment for further observations. The final location highlighted here is in Donaldsonville, LA. MISS 12 is comprised of four points of interest; 12.1, 12.2, 12.3 and 12.4. The first point of interest contains an exposed leaded splice box with an old air test line that appears to still be pressurized with newer connected tubing, suggesting it may still be in use; MISS 12.1 (Figure 8(M)). At that same point, on the opposite side of the pictured telephone pole, is a cut lead sheathed cable (Figure 8(N)). The second point of interest within Location 12 is 12.3, which contains a damaged lead splice box and five lead sheathed cables at the base of an old, cut telephone pole (Figure 9). This splice box and collection of lead sheathed cables are heavily damaged and appear to be disconnected from the infrastructure observed at 12.1.

Analytical Results by Sample

MTS has not performed any analysis relative to collected field samples and their lead content. See Table 2. Summary of sample types and locations for Louisiana.

State Summary & Recommendations

Overall, the findings in Louisiana were robust. It is recommended that a more in-depth survey of the state be performed. There are locations where cables appear to be still in use, as such it is recommended to conduct additional studies on the implications of exposed, bare lead in these waterways. It is likely that more lead sheathed cables would be discovered if more of the locations provided by the WSJ were investigated.

Table 2. Summary of sample types and locations for Louisiana.

Louisiana (18 Sites with Samples)

Atchafalaya River, Bayou Teche and Mississippi River

General Information		Type of Sample Collected					
Site	Date Collected	Sediment (S)	Water (W)	Metal (M)	Other (O)	Total per Site	Code
BL 2.1	5-Jun-2022	0	2	0	0	2	W
BL 2.2	5-Jun-2022	0	2	0	0	2	W
BT 1.1	**3-Jun-2022**	**1**	**3**	**1**	**2**	**7**	**SWMO**
BT 15.1	3-Jun-2022	0	2	0	0	2	W
BT 17.1 (17.2 and 17.4)	**3-Jun-2022**	**1**	**4**	**1**	**0**	**6**	**SWM**
BT 24.1	**3-Jun-2022**	**0**	**0**	**1**	**0**	**1**	**M**
BT 25.1	3-Jun-2022	0	2	0	0	2	W
BT 26.2 (26.3 and 26.4)	**4-Jun-2022**	**1**	**6**	**1**	**0**	**8**	**SWM**
BT 27.1	4-Jun-2022	0	2	0	0	2	W
MISS 3.1	**4-Jun-2022**	**1**	**2**	**1**	**0**	**4**	**SWM**
MISS 1.4	5-Jun-2022	0	0	0	1	1	O
MISS 5.1	5-Jun-2022	0	2	0	0	2	W
MISS 6.1	5-Jun-2022	0	2	0	0	2	W
MISS 7.1	5-Jun-2022	0	2	0	0	2	W
MISS 12.1	**5-Jun-2022**	**1**	**0**	**1**	**0**	**2**	**SM**
MISS 12.3	**5-Jun-2022**	**1**	**0**	**1**	**0**	**2**	**SM**
MISS 12.4	**5-Jun-2022**	**1**	**0**	**1**	**1**	**3**	**SM**
MISS 13.1	5-Jun-2022	0	2	0	0	2	W
	Totals for Louisiana	**7**	**33**	**8**	**4**	**52**	

Notes for Louisiana:

52 Total Samples collected from 18 Sites

BT 1.1 (O) are pieces of cable.

BT 17.1, 17.2 and 17.4 samples are all under Location 17.1, for a total of 6 samples.

BT 26.2, 26.3 and 26.4 samples are all under Location 26.2, for a total of 8 samples.

MISS 1.4 (O) is a piece of cable.

MISS 12.4 (O) is a piece of cable.

Bold line items include a metal sample.

(A) Bell Systems sign for underground Telephone Cables. BL 2.1. Labadieville, Louisiana. June 2022.

(B) Old telephone pole with cable guard and old conduit where a cable would have been. There is currently corrugated plastic hose behind the guard and in the steel pipe, but no visible cable. BL 2.2. Labadieville, Louisiana. June 2022.

Figure 3 Photos. Louisiana. (A) Point of Interest: BL 2.1. (B) Point of Interest BL 2.2.

(C) Remnants of bare lead sheathed cable and steel wire below the Bridge Street Bridge. BT 1.1. June 2022, New Iberia, Louisiana.

(D) Equipment debris field left by workers near the N Lewis Street Bridge. BT 16.1 June 2022, New Iberia, Louisiana.

(E) Rd. 320 southeast of New Iberia, LA. Cluster of lead sheathed cables under the Oliver Bridge. BT 17.1. June 2022, New Iberia, Louisiana.

(F) Up close photo of bare lead sheathed cables coming from the bottom of a lead splice box (upper left corner of photo). BT 24.1. June 2022, St. Martinville, Louisiana.

Figure 4. Photos. Louisiana continued. (C) Point of interest BT 1.1. (D) Point of Interest BT 16.2. (E) Point of Interest BT 17.1. (F) Point of Interest BT 24.1.

(G) Bare lead sheathed cables going into a lead splice box near the sidewalk leading into the Historical District. BT 24.1. June 2022, St Martinville, Louisiana.

(H) Exposed lead splice box with attached cables and drainage into the Bayou Teche. BT 26.2. June 2022, Franklin, Louisiana.

Figure 5. Photos. Louisiana continued. (G) Point of Interest: BT 24.1. (H) Point of Interest: BT 26.5.

(I) New Orleans, LA. MISS 2.1 with Bell Systems manholes, vault, and Utility Building. This is a likely hub and splice area for cables, both old and new. June 2022.

(J) New Orleans, LA. MISS 3.1. is an abandoned collection of cables.

Figure 6. Photos. Louisiana continued. (I) Point of Interest: MISS 2.1. (J) Point of Interest: MISS 3.1.

(K) New Orleans, LA. MISS 3.1. The small rectangle on the left is the passthrough for utility cables. June 2022.

(L) New Orleans, LA. MISS 3.1. Remnants of outer steel wire from a lead sheathed cable. Evidence that parts of the cable may have been scrapped for money. Locals told us that that was done to these cables.

Figure 7. Photos. Louisiana continued. (K-L) Point of Interest: MISS 3.1.

(M) Donaldsonville, LA. Location MISS 12.1. Exposed leaded splice box that appears to still be connected to an air test line. See photo (L) for the abandoned cable just the other side of the splice box. June 2022,

(N) Donaldsonville, LA. Location MISS 12.1. Close up of lead sheathed cable next to lead splice box seen in (K). June 2022.

Figure 8 Photos. Louisiana continued. (M) Point of Interest: MISS 12.1. (N) Point of Interest: MISS 12.1.

Figure 9 Photos. Louisiana continued. Damaged and abandoned leaded splice box and collection of five lead sheathed cables. MISS 12.3. June 2022, Donaldsonville, Louisiana.

Midwest Region

Michigan

Michigan was the only state investigated within the Midwest region. MTS screened a total of seventeen different locations across the state of Michigan. A total of thirty-one points of interest containing GPS data were collected while screening the seventeen locations. The locations generally occurred along the Black River, Detroit River, Lake Huron (Saginaw River), Lake Michigan, St. Clair River, and the Straits of Mackinac. These locations were visited over a period of three field days from July 25- 27, 2022.

Two points of interest were collected along the Detroit River where visible lead sheathed cables were noted. Fourteen points of interest were recorded with AT&T or Bell Systems manholes with a total of twenty-four manholes; additional investigation would be required to determine if lead sheathed cables could be found at those locations.

One point of interest contained a small lead sheathed test line that was strung along the outside of a building tracking a conduit. (Saginaw River). Additional details are provided for each of the areas listed below. Coordinates for each site and point of interest can be found in the following documents:

20220725 Michigan Data Collection – Final
20220726 Michigan Data Collection – Final
20220727 Michigan Data Collection – Final

Black River, Lake Huron (Saginaw River), and St. Clair River

These areas contained mostly AT&T and Bell Systems manholes totaling, ten points of interest with sixteen manholes, one vault and an old telephone pole. Location, LH 2, which includes points of interest 2.1, 2.2 and 2.3; also had an above ground conduit route with a lead sheathed air test line. There were paint markings on the road indicating an AT&T corridor; this is likely an area of potential construction and would require future investigation (Figure 10A-B). For additional information, refer to details in the report titled “20220726 Michigan Data Collection – Final”. Location, LH 3 is the site of a 1920’s era Historical Telecommunications Building and two large Bell Systems manholes. This could be a communications hub for the area.

Lake Michigan (Lake Charlevoix) and Straits of Mackinac

The locations investigated in the Lake Michigan and Straits of Mackinac area had evidence of previously existing cables in utility corridors. This included old telephone poles, signage, and Bell Systems manhole covers. Much of this area has been revitalized and there is evidence to show newer lines and technologies are in place. Evidence of the newer infrastructure includes, new AT&T flagging, fiber optic signage, and newer manhole covers. While the investigation team did not see open evidence of abandoned infrastructure, it is possible some exist beyond what is accessible by public access (e.g., under manhole covers).

Detroit River

The only two locations in the screening areas contain visible lead sheathed cables along the Detroit River. At Location DR 1, there were seven cables along the shoreline and two Bell Systems manholes near the road (Figure 11(C-D)). The other location with a single cable hanging from the bridge and going into the water was found at site DR 2 (Figure 12(E-F)). The cable was cut and clearly abandoned in place. DR 3 was a sampled water intake location. For additional information, refer to details in the report titled “202207727 Michigan Data Collection – Final”.

Analytical Results

MTS has not performed any analysis relative to collected field samples and their lead content. See Table 3. Summary of sample types and locations for Michigan.

State Summary & Recommendations

Overall, the findings in Michigan showed few visible lead sheathed cables with a high potential of buried cables in areas with significant manholes. This may indicate that additional cables could be identified with further investigation if access can be granted.

Table 3. Summary of sample types and locations for Michigan.

Michigan (3 Sites with Samples)

Detroit River

General Information		Type of Sample Collected					
Site	Date Collected	Sediment (S)	Water (W)	Metal (M)	Other (O)	Total per Site	Code
DR 1	**27-Jul-2022**	**1**	**1**	**1**	**1**	**4**	**SWMO**
DR 2	27-Jul-2022	0	1	0	0	1	W
DR 3	27-Jul-2022	0	1	0	0	1	W
	Totals for Michigan	**1**	**3**	**1**	**1**	**6**	

Notes for Michigan:

6 Total Samples collected from 3 Sites

DR 1 (O) Sample is a piece of tar sheathing.

Bold line items include a metal sample.

(A) Paint Markings indicating an AT&T service corridor. The lead sheathed test line follows these markings along the brick building shown above. LH 2.2. July 2022, Bay City, MI.

(B) End of the lead sheathed test line shown in (A). LH 2.3. July 2022, Bay City, MI.

Figure 10 Photos. Michigan. (A) Point of Interest: LH 2.2. (B) Point of Interest: LH 2.3.

(C) Seven lead sheathed cables in the Detroit River. DR 1. July 2022, Trenton, MI.

(D) Lead sheathed cables from (C) continuing past the tree line. They are buried in the ground and run up the hill to a Bell Systems manhole. DR 1. July 2022, Trenton, MI.

Figure 11 Photos. Michigan continued. (C-D) Point of Interest: DR 1. (E) Point of Interest: DR 2.

(E) Lead sheathed cable along the Grosse Ile Parkway Bridge. The cable runs through the concrete and is cut just above the ledge. DR 2. Grosse Ile Township, MI

(F) Cut lead sheathed cable, referenced in (E). DR 2. Grosse Ile Township, MI.

Figure 12 Photos. Michigan continued. (E-F) Point of Interest: DR 2.

Northwest Region

Oregon

MTS screened a total of twelve different site locations across the state of Oregon and collected eighteen points of interest with GPS data. Investigation of locations along the Columbia River and the Willamette River occurred over a period of two field days from August 3-4, 2022. Eight points along the Willamette River contained approximately twenty-nine visible lead sheathed cables; one of those locations contains a cable likely from the Abernathy Bridge, which was not within the screened locations; two points of interest were recorded with Bell Systems or PTco manholes with a total of six manholes plus one vault; leaving the remaining points of interest being a combination of old telecommunication signage, old telephone poles, control locations and cable corridors where no cables were identified. Signs that remained standing within the cable corridors and those tacked into old telephone poles, are related to Pacific Northwest Bell, Western Union Telcom Co., and Bell Systems. Coordinates for each site and sample location can be found in the documents below.

20220803_Oregon Data Collection – Final
20220804_Oregon Data Collection – Final

Columbia River

There were two locations with three points of interest along the Columbia River. No visible lead sheathed cable was observed at these points, however, there was evidence of old telephone poles, Oregon Washington Telephone Company signage, and remnants of the outer steel layer of a lead sheathed cable.

Willamette River

There were seven locations along the Willamette River in Oregon. Nine points of interest were recorded along the Willamette River containing visible lead sheathed submarine cables in varied conditions. At low tide, with lower river levels, WR 1 can be seen on the shoreline protruding from the riverbed. This is a cut and abandoned lead sheathed cable on the east bank of the Willamette River near Ross Island (Figure 13(A)). Our team spoke with a homeless man living on a nearby boat who mentioned the cables being visible at different times during the year. The same location had a newer cut telecommunications cable which also had a thin lead sheathing. Near the Oregon Maritime Museum and Waterfront Park Trail, WR 2.2 contains eleven lead sheathed cables protruding from the wall and running into the Willamette River. The associated site WR 2, just over the railing has five Bell Systems manholes and what appears to be a large access vault (Figure 13(B-C)). Site WR 3 had a much older and smaller lead sheathed cable running just below an old wooden, Western Union Telecom Co. Sign just below the Morrison Bridge (Figure 13(D)). Underneath the West Burnside Bridge, site WR 5.1 had four lead sheathed cables that went submarine where the bridge opens. At the North Steel Bridge, point of interest, WR 6, is a collection of four lead sheathed cables that were observed chained up to the concrete footings, until going inside the footings near the street (Figure 14(E). These were not visible at the southwest end of the bridge, which is also the northernmost end of Portland's Waterfront Park Trail and Greenway. As such, these cables are likely hidden within the new development. The NW Broadway Bridge, at point WR 7, contained a collection of six lead sheathed cables. These cables go submarine at the point the bridge opens. Some of these cables have been struck and damaged

by, passing boats, or floating debris in the river (Figure 14(F)). The final screened location WR 8, was an active construction site along the waterfront. There was limited access to the point of interest provided by the WSJ, however, the team observed a coiled-up, lead sheathed cable on the barge. After a brief discussion with the foreman, it was learned that this cable may have been pulled from the Abernathy Bridge south of Ross Island. This was not a location the team had time to investigate during this trip (Figure 14(G-H)).

Analytical Results

MTS has not performed any analysis relative to collected field samples and their lead content. See Table 4. Summary of sample types and locations for Oregon.

State Summary & Recommendations

Overall, the findings in Oregon showed a high concentration of visible, lead sheathed submarine cables in varied states of abandonment along the banks of the Willamette River at nearly every major bridge crossing observed. This area is a major shipping corridor and remains busy with continued construction. Further investigation into the status of these cables is recommended.

Table 4. Summary of sample types and locations for Oregon.

Oregon (14 Sites with Samples)

Columbia River and Willamette River

General Information		Type of Sample Collected					
Site	Date Collected	Sediment (S)	Water (W)	Metal (M)	Other (O)	Total per Site	Code
WR 1	**3-Aug-2022**	**1**	**1**	**1**	**0**	**3**	**SWM**
WR 1.1	**3-Aug-2022**	**0**	**0**	**1**	**0**	**1**	**M**
WR 2.2	**4-Aug-2022**	**0**	**1**	**1**	**0**	**2**	**WM**
WR 3	**4-Aug-2022**	**0**	**1**	**1**	**0**	**2**	**WM**
WR 3.2	4-Aug-2022	0	1	0	0	1	W
WR 4	4-Aug-2022	0	1	0	0	1	W
WR 5.1	4-Aug-2022	0	1	0	0	1	W
WR 6	**4-Aug-2022**	**0**	**1**	**1**	**0**	**2**	**WM**
WR 7	**4-Aug-2022**	**0**	**1**	**1**	**0**	**2**	**WM**
WR 8	4-Aug-2022	0	1	0	0	1	W
WR 9	4-Aug-2022	0	1	0	0	1	W
WR 10	4-Aug-2022	0	1	0	0	1	W
CR 1	4-Aug-2022	0	1	0	0	1	W
CR 2	4-Aug-2022	0	1	0	0	1	W
	Totals for Oregon	**1**	**13**	**6**	**0**	**20**	

Notes for Oregon:

20 Samples collected from 14 Sites

Bold line items include a metal sample.

(A) Abandoned lead sheathed cable near Ross Island. WR 1. August 2022, Portland, Oregon.

(C) Five Bell Systems manholes with vault. WR 2.2. August 2022, Portland, Oregon.

(B) Eleven cables near Maritime Museum and Waterfront Park. WR 2.2. August 2022, Portland, Oregon.

(D) Smaller lead sheathed cable below Western Union Telecom Co. Sign. WR 3. August 2022, Portland, Oregon.

Figure 13. Photos. Oregon. (A) Point of Interest: WR 1. (B) Point of Interest: WR 2.2. (C) Point of Interest: WR 2.2. (D) Point of Interest: WR 3.

(E) North Steel Bridge cables. WR 6. August 2022, Portland, Oregon.

(G) Active construction site. Lead sheathed cable. Kiewit 204. WR 8. August 2022, Portland, Oregon.

(F) NW Broadway Bridge cables. WR 7. August 2022, Portland, Oregon.

(H) Possible Abernathy Bridge cable. WR 8. August 2022, Portland, Oregon.

Figure 14. Photos. Oregon continued. (E) Point of Interest: WR 6. (F) Point of Interest: WR 7. (G) Point of Interest: WR 8. (H) Point of Interest: WR 8.

Idaho

Investigation of data points along the Snake River, Clearwater River, and Lake Pend Oreille over a period of two field days from August 5-6, 2022. MTS screened a total of eight different site locations across the state of Idaho, with a total of fifteen points of interest containing GPS data. Three points around Lake Pend Oreille contained four visible cables, with one of those points being a newer fiber optic line; two points of interest were recorded with Bell Systems manholes with a total of three manholes; leaving the remaining points of interest being a combination of old telecommunication signage, old telephone poles, control locations and cable corridors where no cables were identified. Signs that remained standing within the cable corridors and those tacked into old telephone poles, are related to General Telephone Company (GTE), Century Link, and Bell Systems. Coordinates for each site and sample location can be found in the documents below.

20220805_Idaho Data Collection – Final
20220806_Idaho Data Collection – Final

Clearwater River and Snake River

Aside from three Bell Systems manholes and three points with "Cable Crossing" signs, this area was void of visible cables. Our team spoke with a lifetime resident and local fisherman on the Clearwater River near the Levee Path in North Lewiston who was aware of the cables from growing up. It is possible with more time and resources we might find them on the riverbed.

Lake Pend Oreille

There was one point with visible lead sheathed cables in Idaho that was found in Lake Pend Oreille on the southeast end of the railroad bridge near Highway 95. This collection of cables was cut and left in place at the base of the bridge. At the time of our most recent visit, there was construction work and a large barge over the location of the cables which are tangled underwater. Refer to Figure 15A-D and Figure 16E-G for Lake Pend Oreille photos.

Analytical Results

MTS has not performed any analysis relative to collected field samples and their lead content. See Table 5. Summary of sample types and locations for Idaho.

State Summary & Recommendations

Overall, our findings in Idaho showed few visible lead sheathed cables with a high potential of buried cables in areas where signs and Bell Systems manholes were observed. The cables found off the old railroad bridge have been cut and left near the base of the bridge. They are clearly abandoned and should be removed. Further investigation into the status of these cables and how to move forward with the next steps of removing the remnants is suggested.

Table 5. Summary of sample types and locations for Idaho.

Idaho (8 Sites with Samples)

Snake River, Clearwater River, and Lake Pend Oreille (Pend Oreille River)

General Information		Type of Sample Collected					
Site	Date Collected	Sediment (S)	Water (W)	Metal (M)	Other (O)	Total per Site	Code
SR 2.1	5-Aug-2022	0	1	0	0	1	W
SR 1	5-Aug-2022	0	1	0	0	1	W
CLR 3.2	5-Aug-2022	0	1	0	0	1	W
LP 1.2	6-Aug-2022	1	1	0	0	2	SW
LP 2	6-Aug-2022	0	1	0	0	1	W
LP 3	6-Aug-2022	0	1	0	0	1	W
LP 4.1	**6-Aug-2022**	**0**	**2**	**1**	**0**	**3**	**WM**
LP 5	6-Aug-2022	0	1	0	0	1	W
	Totals for Idaho	**1**	**9**	**1**	**0**	**11**	

Notes for Idaho:

11 Samples collected from 8 Sites

Bold line items include a metal sample.

(A) Lake Pend Oreille, ID Railroad Bridge. August 2022.

(B) Photo. Lead sheathed cables just below the surface. Site LP 4.1. August 2022, Lake Pend Oreille, ID.

(C) Lead sheathed cables cut and hanging from bridge. Site LP 4.1. August 2022, Lake Pend Oreille, ID.

(D) Bare lead (upper-left). Cut end, near fish (mid-right). Site LP 4.1. August 2022, Lake Pend Oreille, ID.

Figure 15. Photos. Idaho. (A) Lake Pend Oreille Railroad Bridge. (C-D) Point of Interest: LP 4.1.

(E) Close up of small, cut, bare lead sheathed cable underwater. Site LP 4.1. August 2022, Lake Pend Oreille, ID.

(F) Lead sheathed cables abandoned and coiled below the surface. Site LP 4.1. August 2022, Lake Pend Oreille, ID.

(G) Close up of bare lead from abandoned cables. Site LP 4.1. August 2022, Lake Pend Oreille, ID.

Figure 16. Photos. Idaho continued. (E-G) Point of Interest: LP 4.1

Appalachia Region

Pennsylvania

Investigation of data points along the Allegheny River, Ohio River, Monongahela River, including California Township (Coal Center) over a period of three field days from October 23-25, 2022. We screened a total of thirteen different site locations across the state of Pennsylvania with a total of thirty-two points of interest containing GPS data. Two points along the Allegheny River contained visible leaded cables; six points of interest were recorded with Bell systems manholes with a total of nine manholes; thirteen points of interest were recorded within California Township (Coal Center) which followed a bare, overhead, lead sheathed telecommunication cable; leaving the remaining points of interest being a combination of old telecommunication signage, old telephone poles, control locations and cable corridors where no cables were identified. Signs that remained standing within the cable corridors and those tacked into old telephone poles, are related to Bell Atlantic and Bell Telephone Company of PA. Coordinates for each site and sample location can be found in the documents below.

20221023 Pennsylvania Data Collection – Final
20221024 Pennsylvania Data Collection – Final
20221025 Pennsylvania Data Collection – Final

Note: A return trip was made the 14th of February 2023, to gain more information from the overhead telecom cable located in Coal Center, PA.

20230214 Pennsylvania Data Collection –Samples Collected – Final
20230214 Pennsylvania Data Collection –Tracked Data Points ONLY – Final

Allegheny River, Ohio River, and Monongahela River

Aside from the overhead cable found within California Township (Coal Center), there were only two points along the Allegheny River where visible lead sheathed cable was recorded. AR 1 also, has a small portion of lead sheathed cable running up an old telephone pole near a personal watercraft boat launch, with a sitting bench (Figure 17(A-C)).

California Township (Coal Center)

This is the first location during the project where extensive overhead lead sheathed cables were documented and observed. The areas of interest within California and Coal Center, are adjacent and to the west of the Penn West California University, an area that was notably less affluent. Thirteen points of interest were recorded, covering an approximate distance of .9 miles worth of visible, overhead lead sheathed cable (Figure 18(D-G)). This is an estimation following the streets, and not an exact calculation of length. This cable starts on 2nd Street, across from campus and runs through California to the edge of Coal Center where it appears to terminate a few blocks uphill from the Monongahela River's edge. The cable crosses overhead at parks, senior care centers, and many locations where kids were playing. Locals in the area suggested that other

adjacent townships may have similar overhead cables that should be explored. Recommend further investigations.

Analytical Results by Sample

MTS has not performed any analysis relative to collected field samples and their lead content. See Table 6. Summary of sample types and locations for Pennsylvania.

State Summary & Recommendations

Overall, our findings in Pennsylvania showed few visible lead sheathed submarine cables and limited access to areas of interest due to areas of heavy overgrowth. This was the first location where overhead lead sheathed cables were observed and required a change in how the data was recorded for efficiency. The data application needed to be adjusted to not require the cable details for each point of interest, since it was the same cable running through town. MTS recognizes the need for a more thorough investigation of all areas with overhead bare lead sheathed cables.

Table 6. Summary of sample types and locations for Pennsylvania.

Pennsylvania (19 Sites with Samples)

Ohio River, Allegheny River, Coal River, and California Township (Coal Center)

General Information		Type of Sample Collected					
Site	Date Collected	Sediment (S)	Water (W)	Metal (M)	Other (O)	Total per Site	Code
AR – 1	24-Oct-2022	1	0	0	0	1	S
AR – 2	24-Oct-2022	0	1	0	0	1	W
AR – 5	24-Oct-2022	0	1	0	0	1	W
CR – 1	25-Oct-2022	1	1	0	0	2	SW
CR – 2	25-Oct-2022	1	0	0	0	1	S
CT – 1	25-Oct-2022	1	0	0	0	1	S
CT – 2	25-Oct-2022	1	0	0	0	1	S
CT – 3	**25-Oct-2022**	**1**	**0**	**1**	**0**	**2**	**SM**
CT – 4	25-Oct-2022	1	0	0	0	1	S
CT – 5	25-Oct-2022	1	0	0	0	1	S
CT – 6	25-Oct-2022	1	0	0	0	1	S
CT – 7	25-Oct-2022	1	0	0	0	1	S
CT – 8	25-Oct-2022	1	0	0	0	1	S
CT – 9	**25-Oct-2022**	**1**	**1**	**1**	**0**	**3**	**SWM**
CT – 10	25-Oct-2022	1	1	0	0	2	SW
CT – 11	25-Oct-2022	1	0	0	0	1	S
CT – 12	25-Oct-2022	1	0	0	0	1	S
CT – 13	25-Oct-2022	1	1	0	0	2	SW
OR – 3.1	25-Oct-2022	0	1	0	0	1	W
	Totals for Pennsylvania	**16**	**7**	**2**	**0**	**25**	

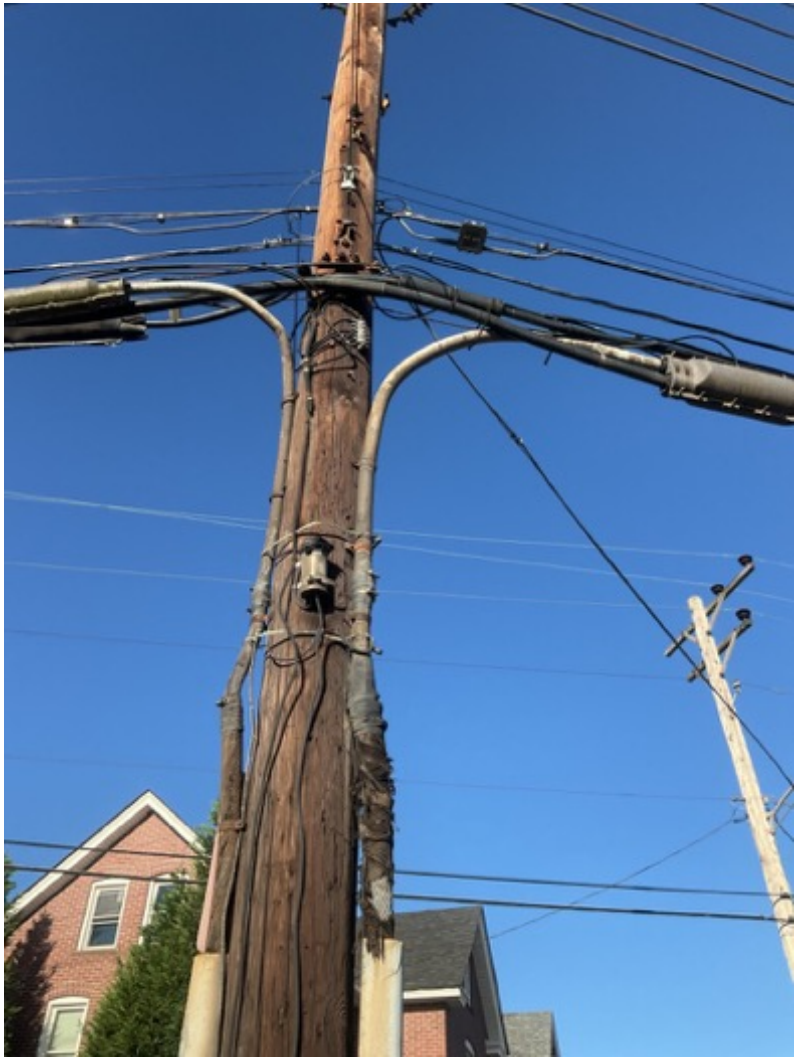
Notes for Pennsylvania:

25 Samples collected from 19 Sites

Bold line items include a metal sample.

(A) Park bench near exposed lead sheathed cables and splice boxes. October 2022. Natrona, Pennsylvania.

(B) Base of telephone pole in (A) and (C) showing marked cable going into the ground. October 2022. Natrona, Pennsylvania.



(C) Close up of lead sheathed cable and splice boxes referenced in (A). October 2022. Natrona, Pennsylvania.

Figure 17 Photos. Pennsylvania. (A-C) Point of Interest: AR 2.

(D) CT6. Overhead lead sheathed cable running across the entrance into apartments and over access to mailboxes. February 2023. Coal Center, Pennsylvania.

(F) CT11. Overhead lead sheathed cable running through a residential area near the end of town. February 2023. Coal Center, Pennsylvania.

(E) CT8. Overhead lead sheathed cable running across a greenway and sidewalk. February 2023. Coal Center, Pennsylvania.

(G) CT12. Overhead lead sheathed cable running across the road next to homes. October 2022. Coal Center, Pennsylvania.

Figure 18. Photos. Pennsylvania continued. (D-G) Points along the lead sheathed telecommunications cable that runs approximately 0.9 miles through California Township and Coal Center, PA. CT 6, CT 8, CT 11 (February 2023), and CT 12 (October 2022). California Township and Coal Center, Pennsylvania.

West Virginia

Investigation of data points along the Coal River and Kanawha River over a period of two field days from October 26-27, 2022. MTS screened a total of fourteen different site locations across the state of West Virginia with a total of twenty-eight points of interest containing GPS data. Three points along the Kanawha River contained visible lead sheathed cables; fourteen points of interest were recorded with Bell Systems manholes with a total of five manholes; leaving the remaining points of interest being a combination of old telecommunication signage and old telephone poles. People in this area appeared suspicious of us. As a result, we were unable to gain access to a few locations of interest. Signs that remained standing within the cable corridors and those tacked into old telephone poles, suggest that the primary telecommunications company for this area was C&P Telephone Company of West Virginia. Coordinates for each site and sample location can be found in the documents below.

20221026 West Virginia Data Collection – Final
20221027 West Virginia Data Collection – Final

Kanawha River

The only three locations in our screening areas were along the Kanawha River. At Site KR 1.3, we identified two lead sheathed cables (Figure 19). This is the landing area for the Old Pliny Ferry Crossing near Frazier Bottom. Site KR 3.1 was heavily overgrown; but we were able to identify at least two lead sheathed cables with splice boxes with sections of bare lead. The cable identified in Site KR 3.5 is part of the overall Site 3. From a distance we were only able to identify one cable on the telephone poles with bare lead. The cable corridor continues along railroad tracks and was largely inaccessible to track the cable further. For additional information please see "*20221026 West Virginia Data Collection – Final*".

Analytical Results by Sample

MTS has not performed any analysis relative to collected field samples and their lead content. See Table 7. Summary of sample types and locations for West Virginia..

State Summary & Recommendations

Overall, our findings in West Virginia showed few visible lead sheathed cables and limited access to areas of interest due to areas of heavy overgrowth and unwelcoming neighborhoods. However, there is evidence to support further investigation.

Table 7. Summary of sample types and locations for West Virginia.

West Virginia (11 Sites with Samples)

Coal River and Kanawha River

General Information		Type of Sample Collected					
Site	Date Collected	Sediment (S)	Water (W)	Metal (M)	Other (O)	Total per Site	Code
Coal R - 1	26-Oct-2022	0	1	0	0	1	W
KR - 1.2	26-Oct-2022	0	1	0	0	1	W
KR - 1.3	26-Oct-2022	1	0	0	0	1	S
KR - 2	26-Oct-2022	0	1	0	0	1	W
KR - 3.1	**26-Oct-2022**	**1**	**0**	**1**	**0**	**2**	**SM**
KR - 3.3	26-Oct-2022	0	1	0	0	1	W
KR - 3.4	26-Oct-2022	0	1	0	0	1	W
KR - 4	26-Oct-2022	1	0	0	0	1	S
KR - 5	26-Oct-2022	0	1	0	0	1	W
KR - 11	26-Oct-2022	0	1	0	0	1	W
	Totals for West Virginia	**3**	**7**	**1**	**0**	**11**	

Notes for West Virginia:

11 Samples collected from 11 Sites

Bold line items include a metal sample.

Figure 19. Photos taken in West Virginia. Site for the Old Pliny Ferry Crossing at Frasier's Bottom. Two bare lead sheathed cables were observed at the end of Ferry Lane. KR 1.3. October 2022, Pliny, West Virginia.

Mid-Atlantic Region

New Jersey

Investigation of data points along the Passaic River and Hackensack River, including the South Kearny Area over a period of two field days: the ninth and tenth of January 2023. MTS screened a total of twenty-one different site locations across the state of New Jersey with a total of forty-five points of interest containing GPS data. Eleven points shared an approximate total of fifty-three visible lead sheathed cables; five of those points were areas containing bare, overhead lead sheathed cable; sixteen points were recorded with Bell Systems or AT&T manholes with a total of forty manholes and two utility buildings; leaving the remaining points of interest being a combination of old telecommunication signage, telephone poles, control locations and one suspected gas pipeline point. Signs that remained standing within the cable corridors and those tacked into old telephone poles, suggest that the primary telecommunications company for this area was Bell Systems and AT&T. Coordinates for each site and sample location can be found in the documents below.

20230109_New Jersey Data Collection – Final
20230110_New Jersey Data Collection – Final

Hackensack River

The investigation along the Hackensack River started with an active construction site containing four Bell System manholes and what appeared to be an old abutment at the water's edge. This site is identified as Hackensack 1 in the data files and would be where the cables came to ground, but access was limited due to construction. For this reason, no samples were collected at this location. The workers allowed us near the fenced area for quick observations. The next location Hackensack 2, had visible cable crossing signs on both sides of the Passaic River, identifying it as a cable corridor. There was a large concrete vault with eight Bell Systems manholes at the river's edge and within the Lincoln Park & Nature Trail recreation area, suggesting that this location is an area that would contain numerous cables (Figure 20(A-D)). Hackensack 3 was recorded in the now, largely abandoned areas around the American Dream Plaza, Meadowlands. This area used to have an old marina and launch ramp at River Barge Park with two adjacent piers that may have served as an old Ferry landing. This area consisted of cable crossing signs on both sides of the river, at least one old telephone pole, one Bell Systems manhole and an old Bell Systems Utility Building. Location observations suggested an old telecommunications cable existed at one point going into the building. There was newer AT&T flagging on the ground, but overall, the area was largely overgrown and difficult to traverse (Figure 21(E-G)). It does warrant further investigation and access from the river to determine without a doubt if submarine cables remain in place. The other locations along the Hackensack included cable crossing signs, Bell Systems manholes, a newly developed bridge area, and the South Kearny area, which is addressed separately.

Passaic River

The investigation along the Passaic River started with an Old Bell Utility Building with seven Bell Systems manholes scattered around the area: four behind a chain link fence and three in a nearby grass area. This is likely a hub or main connection point for multiple cables. There were three main

locations in New Jersey that contained a complex scattering of manholes and numerous visible lead sheathed cables; Passaic 2 with approximately twenty lead sheathed cables visible on both sides of the Bridge Street Bridge (Figure 22(H-I)); Passaic 5 with approximately twenty-one visible, lead sheathed cables between the eleven points of interests near the Washington Crossing State Park, and Passaic 8 with eleven visible, lead sheathed cables on both sides of the Wall Street Bridge (Figure 23(J-L)). Finally, Passaic 3 contained one visible, armored telecommunications cable (Figure 24(A)). There was approximately fifteen feet of armoring before the cable was visible near the waterline. Once the armoring terminated and the lead sheathed cable became visible just above the waterline, observations of lead residue became apparent. This cable was only visible on one side of the bridge and would not be visible with higher water levels.

South Kearny Area

South Kearny is a location with approximately 0.4 miles of exposed, overhead lead sheathed telecommunications cables (2 cables, 2" diameter). Both ends of the cable are cut and shrink wrapped, however, much of the cable remains exposed to the elements (Figure 24(B)). There are remnants of old hangers on wire that would have aided in holding the weight of the cable. These can be seen in the field reports 9 January 2023 under South Kearny, End A. We collected four sediment samples within the 0.4-mile area of the cable. One control location and three below the hanging cable. All coordinates can be found in the New Jersey Data Collection Files.

Analytical Results by Sample

MTS has not performed any analysis relative to collected field samples and their lead content. See Table **8**. Summary of sample types and locations for New Jersey.

State Summary & Recommendations

Overall, our findings show a significant increase in the density and the number of visible lead sheathed submarine cables within screened locations, and a growing trend of observations with overhead, lead sheathed telecommunication cables. New Jersey is a candidate for further scientific research given easy access to areas with numerous lead sheathed cables. MTS recommends a more thorough investigation of all areas with overhead bare lead sheathed cables.

Table 8. Summary of sample types and locations for New Jersey.

New Jersey (17 Sites with Samples)

Passaic River and South Kearny Neighborhood

General Information		Type of Sample Collected					
Site	Date Collected	Sediment (S)	Water (W)	Metal (M)	Other (O)	Total per Site	Code
Passaic 10	10-Jan-2023	1	0	0	0	1	S
Passaic 2	**10-Jan-2023**	**0**	**1**	**1**	**0**	**2**	**WM**
Passaic 3	9-Jan-2023	1	1	0	0	2	SW
Passaic 4	9-Jan-2023	1	0	0	0	1	S
Passaic 5.10	**10-Jan-2023**	**1**	**1**	**1**	**0**	**3**	**SWM**
Passaic 5.3	**10-Jan-2023**	**1**	**1**	**1**	**0**	**3**	**SWM**
Passaic 5.8	**10-Jan-2023**	**1**	**1**	**3**	**0**	**5**	**SWM**
Passaic 5.9	10-Jan-2023	1	1	0	0	2	SW
Passaic 6	10-Jan-2023	1	0	0	0	1	S
Passaic 7	10-Jan-2023	1	0	0	0	1	S
Passaic 8	**10-Jan-2023**	**1**	**1**	**2**	**0**	**4**	**SWM**
Passaic 8.1	10-Jan-2023	1	1	0	0	2	SW
Passaic 9	10-Jan-2023	1	0	0	0	1	S
South Kearny 1	9-Jan-2023	1	0	0	0	1	S
South Kearny 2	9-Jan-2023	1	0	0	0	1	S
South Kearny 3	9-Jan-2023	1	0	0	0	1	S
South Kearny 4	9-Jan-2023	1	0	0	0	1	S
	Totals for New Jersey	**16**	**8**	**8**	**0**	**32**	

Notes for New Jersey:

32 Total Samples collected from 17 Sites

Bold line items include a metal sample.

(A) Large vault with eight Bell Systems manholes on the Hackensack River. Looking towards South Kearny. January 2023, West Side, New Jersey.

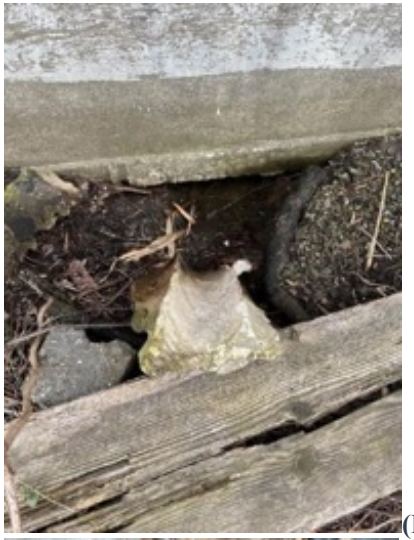
(C) Vault area looking towards Lincoln Park Wetlands & Nature Trail. January 2023, West Side, New Jersey.

(B) Cable landing area covered with concrete. Area is below the sign in (D). January 2023, West Side, New Jersey.

(D) Cable Crossing Sign. January 2023, West Side, New Jersey.

Figure 20. Photos. New Jersey. (A-D) Cable locations near Lincoln Park Wetlands & Nature Trail. Hackensack 2. January 2023, West Side, New Jersey.

(E)



(F)

(G)

Figure 21. Photos. New Jersey continued. (E) Largely abandoned area around the Meadowlands. Old Bell Systems manhole and utility building. (F) Concrete casing that would have laid on top of the old lead sheathed cable. This is like those found on the Detroit River, Location 1. (G) Newer AT&T flagging found a few feet away from the building. Hackensack 3.2. January 2023, Meadowlands, New Jersey.

(H) Evidence of homeless sleeping next to these cables along the Passaic River. Passaic 2. January 2023, Harrison/University Heights, New Jersey.

(I) Cable location with twenty lead sheathed cables underneath the Bridge Street Bridge (Harrison Ave.). Passaic 2.1 January 2023. Harrison/University Heights, New Jersey.

Figure 22. Photos. New Jersey continued. (H) Points of Interest: Passaic 2. (I) Point of Interest: Passaic 2.1.

(J) Part of a complex site containing twenty-one cables near Washington Crossing State Park along the Passaic River. Passaic 5.10. January 2023. New Jersey.

(K) Close up of cables at Passaic 8. January 2023. New Jersey.

(L) Part of an eleven-cable location found near Wall Street Bridge, between Garfield and Wallington. Passaic 8. January 2023. New Jersey.

Figure 23. Photos. New Jersey continued. (J-K) Cable location with approximately twenty-one exposed lead sheathed cables underneath the Main Avenue Bridge near Wallington, New Jersey. This was a complex site with cables in multiple locations withing the site and included twelve different points of interest. Passaic Location 5. January 2023. Wallington, New Jersey.

(A) Armored cable approximately fifteen feet from the water's edge. Passaic 3. January 2023, Belleville, New Jersey.

(B) Overhead cut, lead sheathed cables in the South Kearny area. There are two cables that run approximately 0.4 miles. South Kearny End A. January 2023, Kearny, New Jersey.

Figure 24. Photos. New Jersey continued. (A) Point of Interest: Passaic 3. (B) Point of Interest: South Kearney End A.

New York

Investigation of data points along the Hudson River, Harlem River, Wappingers Falls and the Townships of New Windsor, Newburgh, Highland Falls, and the Palisades; over a period of two field days from January 11-12, 2023. MTS screened a total of twenty-three different site locations across the state of New York with a total of thirty-seven points of interest containing GPS data. Fourteen points with visible lead sheathed cables were found in the areas of Highland Falls, New Windsor, Newburgh, Wappingers Falls and the Hudson River; four points of interest were recorded with Bell Systems manholes with a total of four manholes and a potential vault; leaving the remaining points of interest being a combination of old telecommunication signage and old telephone poles. Signs that remained standing within the cable corridors and those tacked into old telephone poles, suggest that the primary telecommunications company for this area was Bell Systems, New York Telephone and Verizon. Coordinates for each site and sample location can be found in the documents below.

20230111 New York Data Collection – Final
20230112 New York Data Collection – Final

Highland Falls Township

Four generalized data points were recorded for Highland Falls Township. Lead sheathed cable appears to run throughout the town and is occasionally covered with a protective sheathing that encompasses parts of the cable. Visible bare leaded splice boxes were observed at nearly every telephone pole. (Figure 25(A-C)). This site required more time than was available for detailed observations and further investigation is recommended.

Hudson River and Palisades

Three points along the Hudson River contained a total of eleven visible lead sheathed cables. One of these points (Hudson 7) is also referenced in the Palisades Neighborhood where overhead lead sheathed cables were observed. Hudson 3 location was the most comprehensive location with points of interest along the east and west shorelines of the Hudson River. This location contained evidence of old telecommunication signage; Bell Systems manholes and possible vault, visible lead sheathed cables; and cut cables at the base of an old telephone pole (Figure 26(D-E)).

Newburgh and New Windsor Townships

Eight generalized points were recorded across Newburgh and New Windsor Townships. MTS observed cables at various locations while passing through both towns. In Newburgh, MTS spoke with a Verizon worker who mentioned that lead was a concern in the area, but that the company was understaffed and unable to address those concerns. Newburgh was the first area that our team noticed a plastic umbrella covering, that we learned was called a squirrel guard (Figure 27(F-G)). This covering does not contain the entire cable and appears to be intended to help prevent the squirrels from eating the cables and damaging the lines. In New Windsor, one point was recorded showing damaged cable and splice box at the base of a telephone pole near a busy intersection. The cable looks to be out of service but would require a more thorough investigation (Figure 27).

Palisades Neighborhood -Washington Square Road, and Hudson River

There are three generalized points within the Palisades Neighborhood. Hudson 7 and Hudson 8 are also both found in the Palisades Neighborhood where Washington Springs Road turns into Snedens Landing and terminates along the Hudson River. This is an affluent area filled with mansions and has sections of overhead bare lead sheathed cable running from the river and up along Washington Springs Road. MTS stopped tacking the cable near highway 9W. It is a relatively compact neighborhood with narrow roads leading to the large mansions. The utility poles are close to the road with lead sheathed cables running directly overhead. MTS recommends a more thorough investigation of the area to determine if there are additional lines that were not initially observed (Figure 28(H-J)).

Wappingers Falls Township

Three points within Wappingers Falls contained visible lead sheathed cables; observations at Wappingers Falls 3 show a damaged cable and splice box at the base of a telephone pole. The cable looks to be out of service (Figure 29(K-L)). Wappingers Falls 4 has an overhead lead sheathed cable near a grassy play area. MTS recommends a more thorough investigation.

Analytical Results by Sample

MTS has not performed any analysis relative to collected field samples and their lead content. See Table 9. Summary of sample types and locations for New York.

State Summary & Recommendations

Overall, our findings in New York were like those in New Jersey, with visible lead sheathed submarine cables and an increasing number of observed, overhead, lead sheathed telecommunication cables. MTS recommends more thorough investigation of all areas with overhead bare lead sheathed cables, to map locations and determine if there are health and safety risks that may be present for the residents.

Table 9. Summary of sample types and locations for New York.

New York (11 Sites with Samples)

Hudson River, New Windsor and Wappingers Falls

General Information		Type of Sample Collected					
Site	Date Collected	Sediment (S)	Water (W)	Metal (M)	Other (O)	Total per Site	Code
Hudson 3.1	11-Jan-2023	0	1	0	0	1	W
Hudson 3.4	**11-Jan-2023**	**1**	**0**	**1**	**0**	**2**	**SM**
Hudson 4	11-Jan-2023	0	1	0	0	1	W
Hudson 5	12-Jan-2023	0	1	0	0	1	W
Hudson 6	12-Jan-2023	1	0	0	0	1	S
Hudson 7	12-Jan-2023	1	1	0	0	2	SW
Hudson 8	12-Jan-2023	1	0	0	0	1	S
New Windsor 1	**11-Jan-2023**	**1**	**0**	**1**	**0**	**2**	**SM**
New Windsor 2	11-Jan-2023	1	0	0	0	1	S
Wappingers Falls 3	**12-Jan-2023**	**0**	**0**	**1**	**0**	**1**	**M**
Wappingers Falls 4	12-Jan-2023	1	0	0	0	1	S
	Totals for New York	**7**	**4**	**3**	**0**	**14**	

Notes for New York:

14 Total Samples collected from 11 Sites

Bold line items include a metal sample.

(A) Close up of telephone poles with overhead lead sheathed cable and leaded splice boxes. January 2023. Highland Falls, New York.

(B) Overhead lead sheathed cables in front of an apartment complex. January 2023. Highland Falls, New York.

(C) Exposed bare lead splice box and lead cable. January 2023. Highland Falls, New York.

Figure 25. Photos. New York. (A-C) Point of Interest: Highland Falls 1-3.

(D) Cables run under the road and into the Hudson River near the Mid-Hudson Bridge at Point of Interest: Hudson 3.1. January 2023. Highland, New York.

(E) Severed cable and steel wire at the base of an old telephone pole, across from those shown in (D). Point if Interest: Hudson 3.4. January 2023. Highland, New York.

Figure 26. Photos. New York continued. (D) Point of Interest: Hudson 3.1. (E) Point of Interest: Hudson 3.4.

(F) "Squirrel Guard" tied around an exposed area of lead sheathed cable. Point of Interest: Newburgh 1. January 2023, Newbury, New York.

(G) Damaged lead cable and splice box at the base of an old telephone pole. Point of Interest: New Windsor 1. January 2023, New Windsor, New York.

Figure 27. Photos. New York continued. (F) Point of Interest: Newburgh 1. (G) Point of Interest: New Windsor 1.

(H) Abandoned 5” lead sheathed cable along the Hudson River. January 2023, Palisades, New York.

(I) Close up of abandoned 5” lead sheathed cable along the Hudson River. January 2023, Palisades, New York.

(J) Bare lead sheathed cable running up telephone pole in the Palisades. January 2023, Palisades, New York.

Figure 28. Photos. New York continued. (H-I) Point of Interest, Hudson 7. (J) Point of Interest: Palisades 3.

(K) Damaged lead sheathed cable at the base of a telephone in Wappingers Falls. Point of Interest: Wappingers Falls 3. January 2023, Wappingers Falls, New York.

(L) Close up of damaged lead sheathed cable shown in (K). Wappingers Falls 3. January 2023, Wappingers Falls, New York.

Figure 29. Photos. New York continued. (K-L) Point of Interest: Wappingers Falls 3.

West Region

California

Investigation of data points along two specific cables that have been identified in Lake Tahoe and Emerald Bay: over a period of four field days from March 30-31, and May 5-6, 2023. MTS screened a total of twenty-one points of interest along both cables to collect samples. The primary telecommunications company for this area was Bell Systems and AT&T. Coordinates for each site and sample location can be found in the documents below.

20230330 California Data Collection – Final
20230331 California Data Collection – Final
20230505 California Data Collection - Final
20230506 California Data Collection – Final

Lake Tahoe

The main Lake Tahoe cable is approximately seven miles long and runs along the western shoreline from Baldwin Beach to Four-Ring Road. It was installed in 1955 in efforts to extend and improve telecommunications to the west shore. This is a 3.5-inch lead sheathed cable with five leaded splice boxes on land. This cable is not severed in water, however, there are numerous damaged locations. This cable is severed on land. The cable can be observed above water to roughly 100-ft deep in Lake Tahoe. The Rubicon area is a wall of granite, and the cable is draped along the granite wall and boulders. All steel rock anchors and associated cables that would have held the cable in place, are broken (Figure 30(A-C) and Figure 31(D-F)).

Emerald Bay

The shorter Emerald Bay cable is approximately two thousand feet long and runs across the mouth of Emerald Bay. It was installed in 1928 in efforts to bring telecommunication to the Vikingsholm Property located within the bay. This is a 3-inch lead sheathed cable with two severed ends in the water. At some point, this cable was drug and damaged by a large vessel and now rests by the sill of Emerald Bay. It is possible, this event or series of events lead to its abandonment (Figure 32 (G-H)).

Analytical Results by Sample

MTS has not performed any analysis relative to collected field samples and their lead content. See Table 10. Summary of sample types and locations for California.

State Summary & Recommendations

These two cables are part of an ongoing settlement, where AT&T has agreed to remove them from Emerald Bay and Lake Tahoe. A list of results for sampled points of interest can be found in Appendix F and Appendix G, at the end of this document.

Table 10. Summary of sample types and locations for California.

California - Lake Tahoe Cable (26 Sites with Samples)

Lake Tahoe including Emerald Bay

General Information		Type of Sample Collected					
Site	Date Collected	Sediment (S)	Water (W)	Metal (M)	Other (O)	Total per Site	Code
LTI 1.1	5-May-2023	0	1	0	0	1	W
LT 1.2	**30-Mar-2023 and 1-Apr-2023**	**1**	**0**	**3**	**0**	**4**	**SM**
LTI 2.1	5-May-2023	0	1	0	0	1	W
LTI 3.1	5-May-2023	0	1	0	0	1	W
EB 1	31-Mar-2023 and 5-May-2023	1	2	0	0	3	SW
EB 1.1	31-Mar-2023 and 5-May-2023	2	2	0	0	4	SW
EB 1.2	5-May-2023	0	1	0	0	1	W
EB 1.3	5-May-2023	0	1	0	0	1	W
EB 1.4	5-May-2023	0	1	0	0	1	W
EB 1.5	5-May-2023	0	1	0	0	1	W
EB 1.6	5-May-2023	0	1	0	0	1	W
EB 1.7	5-May-2023	0	1	0	0	1	W
EB 3	5-May-2023	0	1	0	0	1	W
EB 4	5-May-2023	0	1	0	0	1	W
LT 1.4	31-Mar-2023 and 5-May-2023	2	2	0	0	4	SW
LT 4	5-May-2023	0	1	0	0	1	W
LTI 7.1	6-May-2023	0	1	0	0	1	W
LTI 7.2	6-May-2023	0	1	0	0	1	W
LT 1.6	6-May-2023	1	1	0	0	2	SW
LT 1.7	6-May-2023	1	1	0	0	2	SW
LT 1.5	5-May-2023	1	0	0	0	1	S
LT 1	30-Mar-2023	1	0	0	0	1	S
LT 1.3	31-Mar-2023	1	0	0	0	1	S
LT 2	31-Mar-2023	1	0	0	0	1	S
LT 3	31-Mar-2023	1	0	0	0	1	S
EB 2	31-Mar-2023	0	1	0	0	1	W
	Totals for California	**13**	**23**	**3**	**0**	**39**	

Notes for California:

39 Samples collected from 26 Sites

LT 1.2 has metal samples from an old cable, new cable, and splice box.

Bold line items include a metal sample.

(A) Severed lead sheathed cables, and lead splice box on land. This photo was during a site visit with AT&T in January 2021.

(B) Another splice location from land during the same site visit with AT&T in January 2021.

(C) Diver marking locations of damage during a survey in April/March 2022, Lake Tahoe, California.

Figure 30. Photos. California. (A-C) Lake Tahoe main telecommunications cable.

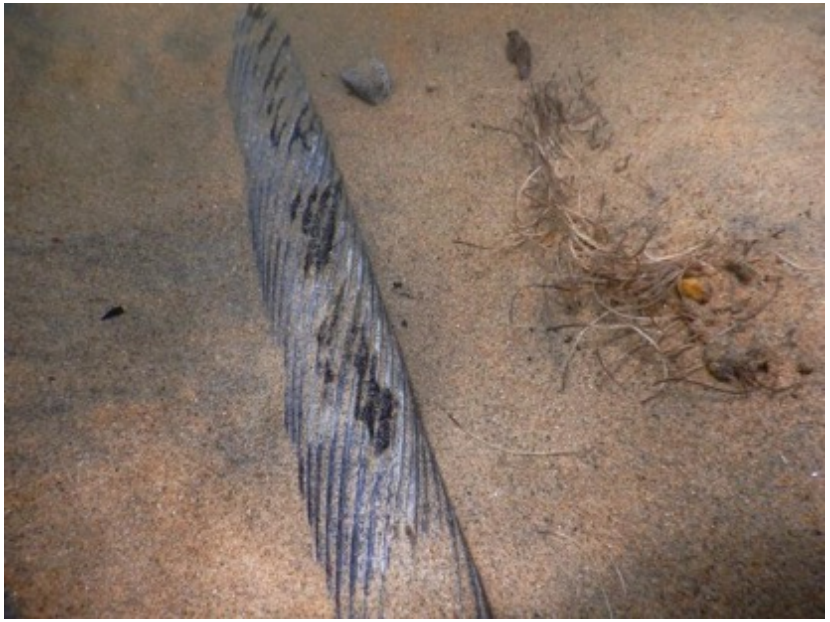
(D) Lead sheathed cable laying among boulders on the lake bottom. April/March 2022. Lake Tahoe, California.

(E) Part of a broken anchor on the cable near Rubicon. April/March 2022. Lake Tahoe, California.

(F) Broken cable anchor on land near Rubicon. April/March 2022. Lake Tahoe, California.

Figure 31. Photos. California continued. (D-F) All photos from survey in April/March 2022, Lake Tahoe, California.

(G) Severed end of 1920's cable in Emerald Bay. May 2021, Emerald Bay - Lake Tahoe, California.



(H) 1920's lead sheathed cable resting on the lake bottom in Emerald Bay. May 2021, Emerald Bay - Lake Tahoe, California.

Figure 32. Photos. California continued. (G-H) May 2021, Emerald Bay – Lake Tahoe, California.

DISCUSSION

MTS completed sampling in all six regions with the WSJ team, except for California. This collaboration was an initial investigation to identify the potential extent of lead-containing cables in multiple regions within the U.S. The regions and locations within the regions were targeted and sampled as requested by the WSJ. Where lab samples were collected, they were collected to determine the current level of lead in areas adjacent to cables; however, these data were not analyzed by MTS in a manner to determine the source of the lead.

Lead-sheathed cables were found in all regions visited. The investigation was not exhaustive. It is likely that additional cables containing lead could be identified if the investigation was expanded. Samples of the surrounding water and sediment in all regions came back with high lead numbers at some locations. Further investigations are needed to find sources of these lead hits in our drinking water and environment. Ultimately, MTS was only able to screen a small percentage of the locations provided by the Wall Street Journal as this was intended to be a preliminary study. Additional funding is needed to further investigate these issues.

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20220605_Louisiana Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum

20220625_Michigan Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum.

20220626_Michigan Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum.

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20220803_Oregon Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum.

20220804_Oregon Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum.

20220805_Idaho Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum.

20220806_Idaho Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum.

20221023_Pennsylvania Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum

20221024_Pennsylvania Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum

20221025_Pennsylvania Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum

20221026_West Virginia Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum

20221027_West Virginia Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum

Map Chart 2023, Map Chart website, accessed 04 July 2023, https://www.mapchart.net.

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20230112_New York Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum.

20230214_Pennsylvania Data Collection – Final. Below the Blue 501(c)3/Lead Cable Investigation. Fulcrum.