

## **Continuing Investigation of the Nature and Extent of Ash in the Emory, Clinch and Tennessee River Bottoms**

TVA continues to refine assessments of the extent of ash deposition and movement in the Emory, Clinch, and Tennessee Rivers. This posting provides results of studies conducted in late July and early August using a new, more accurate technique that is described in more detail below.

This improved assessment shows ash is present from:

- Emory River mile 0.0 to about mile 6
- Clinch River mile 0.0 to about mile 5
- Tennessee River Mile (TRM) 561.8 to TRM 568.7 with traces extending about two miles downstream beyond TRM 561.8.

These results are consistent with those of earlier studies posted on June 16, 2009, that were based solely on visual observations of sediment samples collected at a few discreet locations along the river system. Those earlier studies found trace quantities of ash on the river bottom downstream to TRM 563. Since there have been no significant high river flows in the time between the two studies, we believe the difference between the downstream extents reported by the two studies reflects more accurate measurements in the current study, rather than ash movement.

These results do not change any current Tennessee Department of Environment and Conservation recreation or fish consumption advisories for the Emory River, Clinch River, and Watts Bar Reservoir.

These studies are providing information that will be used to help address the question of whether there are any places in the Clinch or Tennessee Rivers where ash should be removed. At present, TVA's efforts are focused on removing ash from the Emory River as quickly as possible. The decision on whether to remove ash from further downstream will be based on an Engineering Evaluation/Cost Analysis being performed as part of the CERCLA process.

Because it is impractical to collect enough sediment samples to fully describe the distribution of ash on the river bottom, in July TVA purchased a device called a sub-bottom profiler that uses high-intensity sound waves to continuously record the depths of layers of materials deposited on the river bottom. This instrument is basically a sophisticated depth finder that is towed just below the water surface, sending signals intense enough to penetrate the bottom deposits. Properly interpreted, the reflected signals may distinguish between ash deposits and natural river sediments and can estimate the depth of each layer of ash or sediment. As the profiler is towed and depths of ash are recorded electronically, samples of the bottom materials are collected at a few locations to confirm the interpretation of the sub-bottom profiler signals and to confirm ash and sediment layer depths.

The initial work using the profiler has focused on better identifying the upstream and downstream extents of ash deposits in the Emory, Clinch, and Tennessee Rivers. That work is complete and is reported in this posting.

Figure 1 summarizes the results, better defining the upstream and downstream extents of ash deposited in the Emory, Clinch and Tennessee Rivers. Yellow lines show where mostly contiguous layers of ash taper off to less than ¼ inch thick. Colored dots show the results of specific box core bottom sampling:

- Red dots indicate the presence of ash in the top 8 inches or less of sediment,
- Yellow dots indicate a small trace of ash in the top 8 inches or less of sediment, and
- Green dots indicate no ash was observed in the top 8 inches or less of sediment.

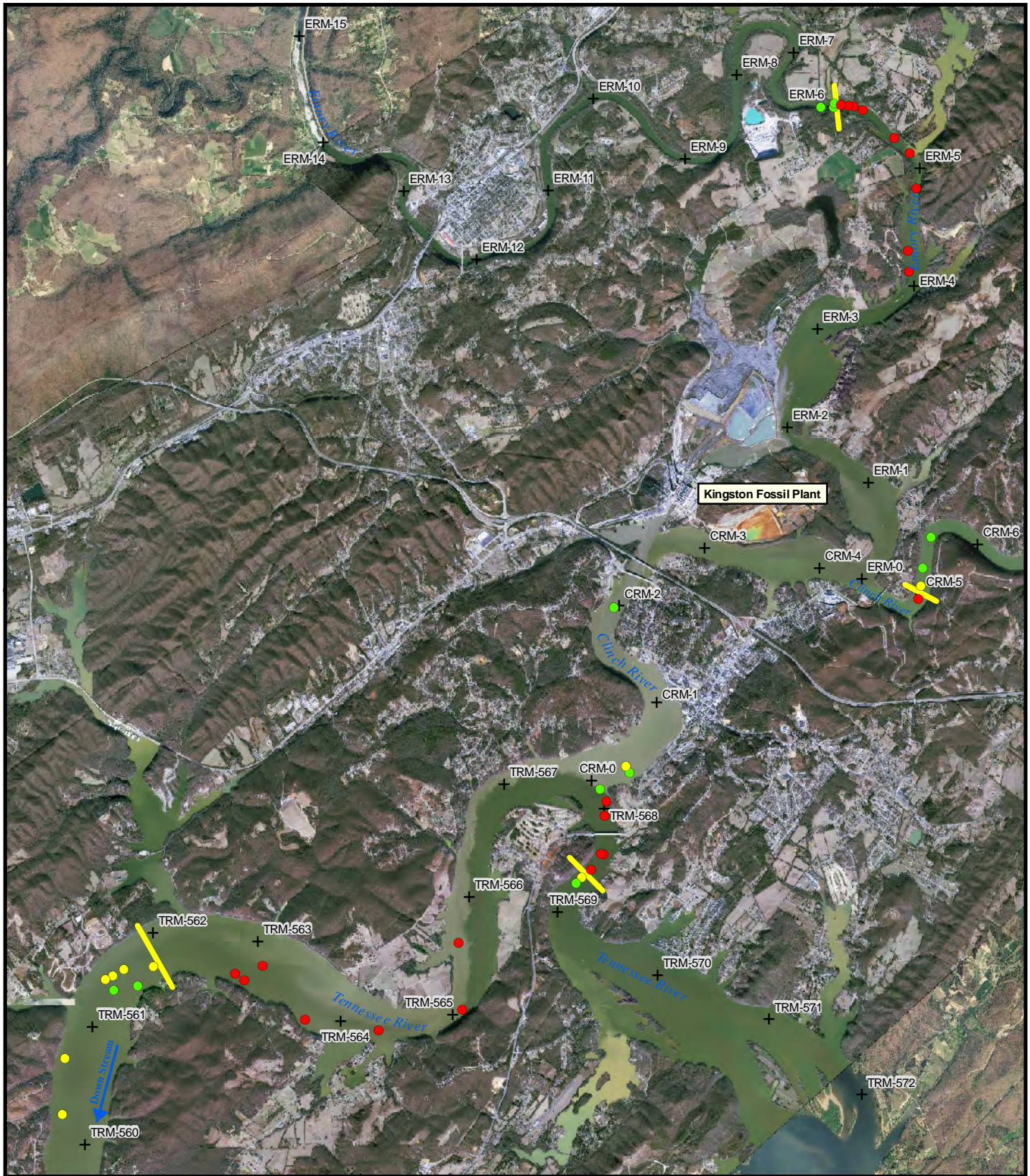
Figures 2 through 6 provide more information about the summarized sediment data in Figure 1. If you click inside one of the black inset map boxes on the key map (Figure 2), it will bring up another map with an enlarged view of that area (Figures 3-6). Samples indicate that:

- the ash is mixing with native sediments,
- in many areas a thin layer of native sediments is being deposited on top of the ash,
- in some areas there is no ash from the spill in the sampled sediment.

Please note that the sediment samples depicted vary in depths from 6 inches to less than one inch. The varying sample retrieval depths are due to differing field conditions that would not allow maximum sample collection depths. Hard sediments (gravel), steep underwater slopes, or swift currents make it difficult to collect samples the full depth of the box corer.

TVA continues to obtain more detailed information on the distribution of ash on the river bottom and the extent to which it is mixing with or being covered by native sediments. TVA will post additional maps depicting the nature and extent of ash in the river bottoms as additional information from sediment cores and sub-bottom profiler tows are collected.

# Extent of Measurable Ash on River Bottom as of August 5, 2009 (Phase 1)



0 2,000 4,000 6,000 8,000  
Feet

Project: \\knxpgfb16\KIF\_EMT\GIS\Kingston\_Ash\_Slides\mxd\Ash\_Underwater\_Phase1\_8x11\_20090806\_r2.mxd

- Ash Present
- Trace of Ash Present
- Ash Not Present
- Extent of Measurable Ash \*

\* Extent of Measurable Ash is defined as mostly contiguous ash that is at least 1/4 inch thick. Some samples beyond the extent line may contain traces of ash.  
All sample points taken from box corer which has maximum recovery depth of 8 inches.

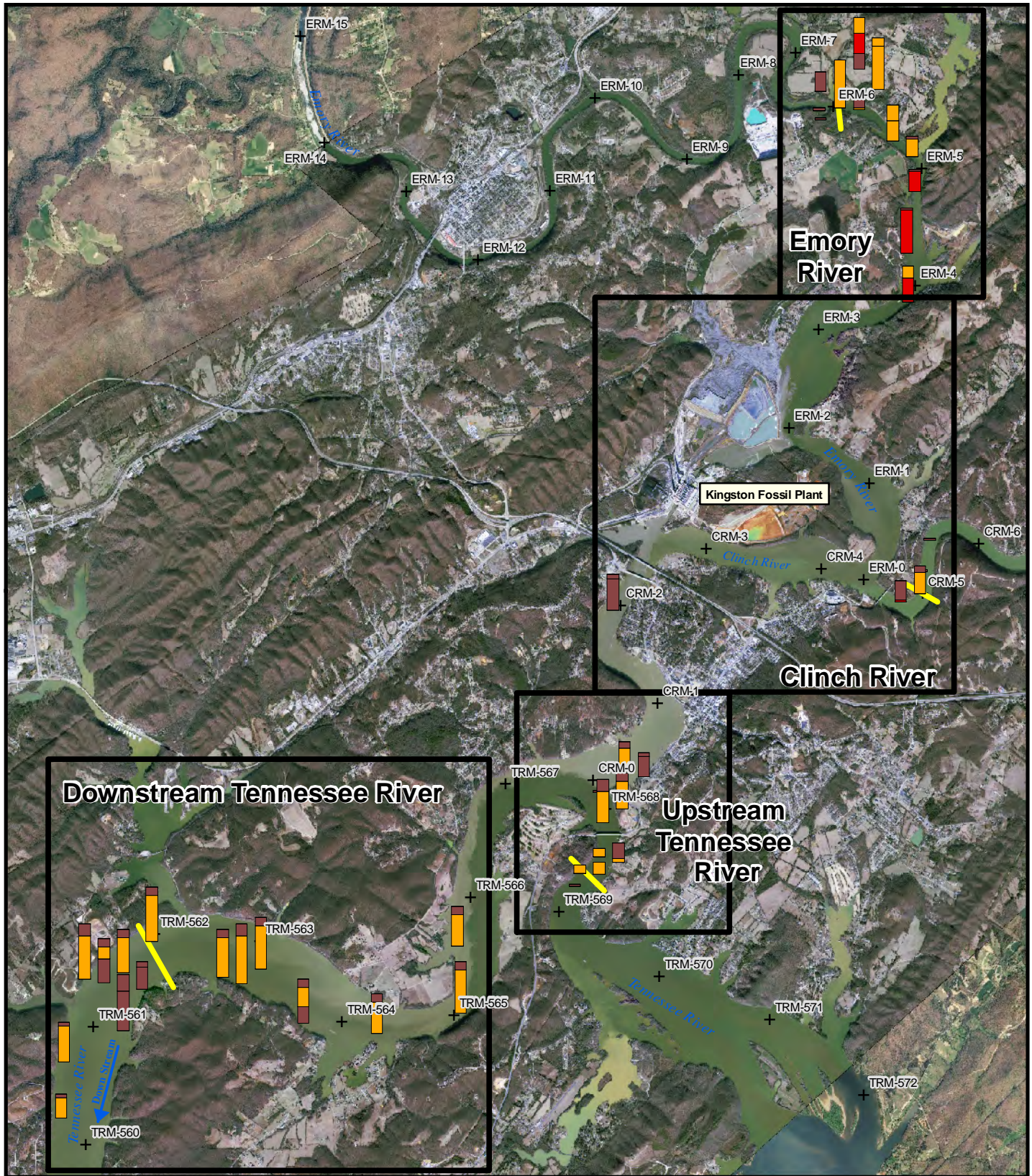
Date of map imagery:  
January 09, 2009

Core data:  
July 28 - August 5, 2009

Tennessee Valley Authority  
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Figure 1

# Key Map for Nature and Extent of Ash in the River Bottom as of August 5, 2009 (Phase 1)



**Sediment Type**

- Ash
- Mixed (Ash and Native)
- Native
- Extent of Measurable Ash \*\*

\*\* Extent of Measurable Ash is defined as mostly contiguous ash that is at least 1/4 inch thick. Some samples beyond the extent line may contain traces of ash.

All sample points taken from box corer which has maximum recovery depth of 8 inches.

The locations of sediment columns depicted are approximate in order to visualize on map.

Date of map imagery:  
January 09, 2009

Core data:  
July 28 - August 5, 2009

Tennessee Valley Authority  
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36MS 822A 501 D  
10/08/2009

Vertical scale of sediment columns

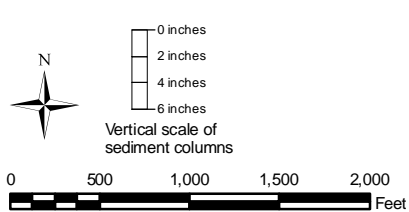
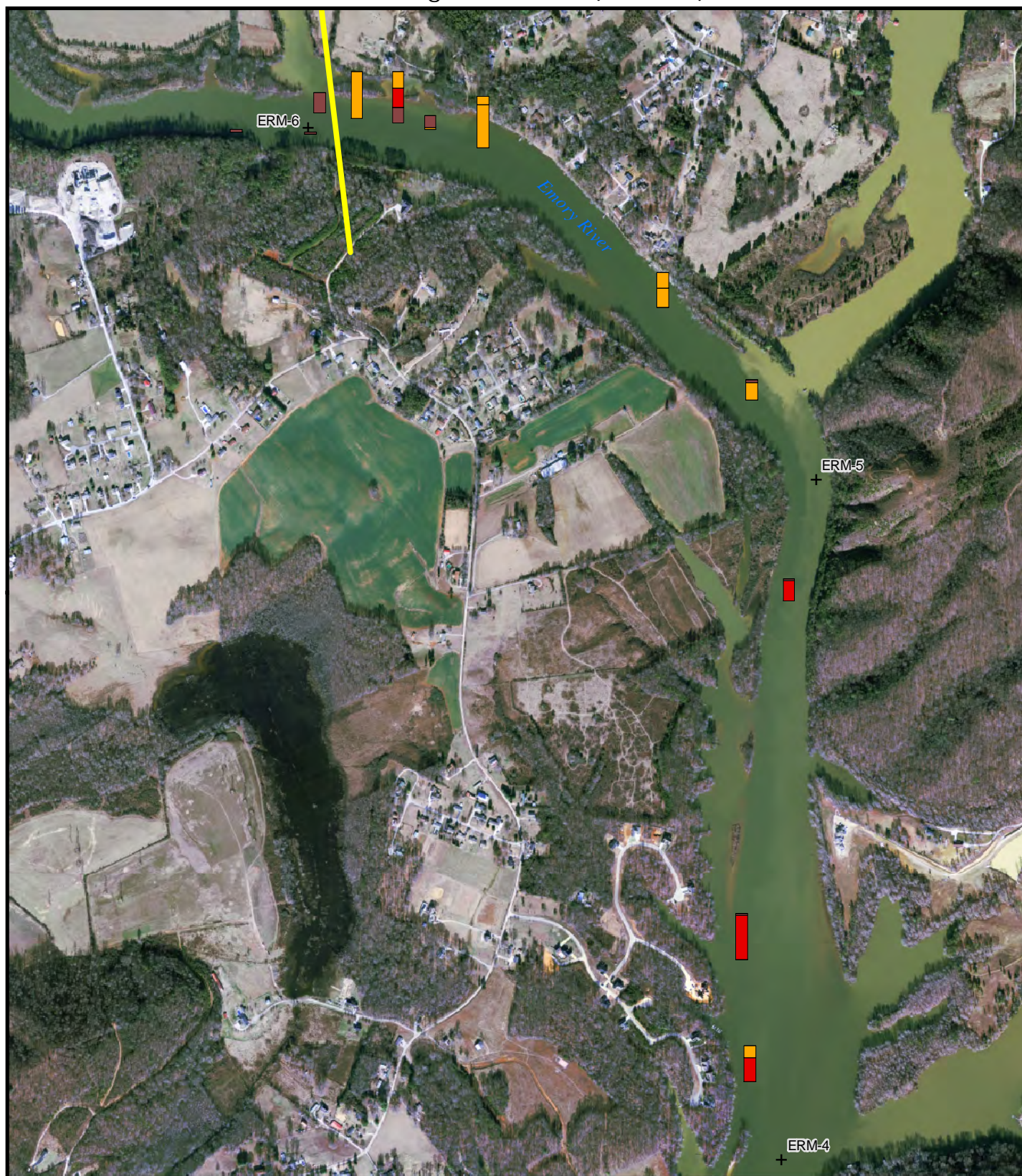
0 inches  
2 inches  
4 inches  
6 inches

0 2,000 4,000 6,000 8,000 Feet

Project: \\kxpgt\16\KIF\_EM\GIS\Kingston\_Ash\_Slide\ mxd\Ash\_Underwater\_Phase1B\_KEYAREAS\_36MS822A501D.mxd

Figure 2

# Nature and Extent of Ash in the Emory River Bottom as of August 5, 2009 (Phase 1)



**Sediment Type**

- Ash
- Mixed (Ash and Native)
- Native
- Extent of Measurable Ash \*\*

\*\* Extent of Measurable Ash is defined as mostly contiguous ash that is at least 1/4 inch thick. Some samples beyond the extent line may contain traces of ash.

All sample points taken from box corer which has maximum recovery depth of 8 inches.

The locations of sediment columns depicted are approximate in order to visualize on map.

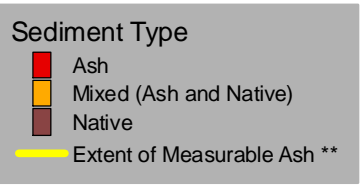
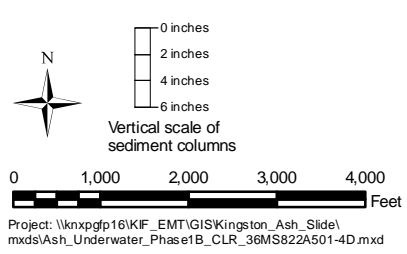
Date of map imagery:  
January 09, 2009

Core data:  
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10/08/2009

Figure 3

# Nature and Extent of Ash in the Clinch River Bottom as of August 5, 2009 (Phase 1)



\*\* Extent of Measurable Ash is defined as mostly contiguous ash that is at least 1/4 inch thick. Some samples beyond the extent line may contain traces of ash.

All sample points taken from box corer which has maximum recovery depth of 8 inches.

The locations of sediment columns depicted are approximate in order to visualize on map.

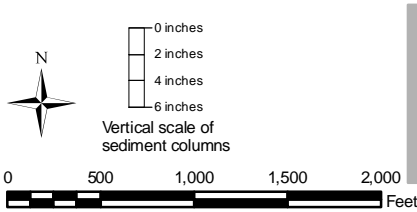
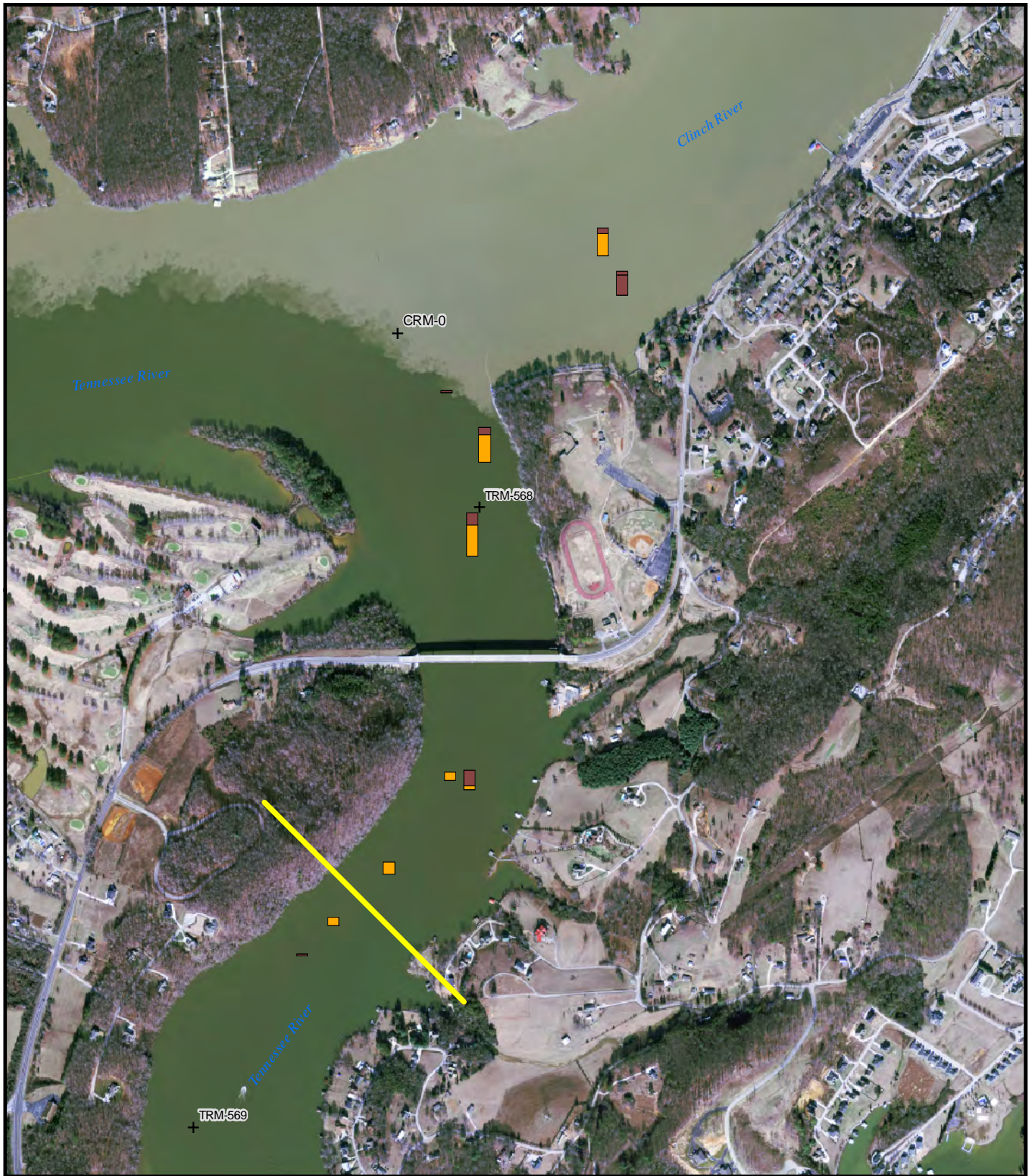
Date of map imagery:  
January 09, 2009

Core data:  
July 28 - August 5, 2009

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10/08/2009

Figure 4

# Nature and Extent of Ash in the Tennessee River Bottom Upstream as of August 5, 2009 (Phase 1)



**Sediment Type**

- Ash
- Mixed (Ash and Native)
- Native
- Extent of Measurable Ash \*\*

\*\* Extent of Measurable Ash is defined as mostly contiguous ash that is at least 1/4 inch thick. Some samples beyond the extent line may contain traces of ash.

All sample points taken from box corer which has maximum recovery depth of 8 inches.

The locations of sediment columns depicted are approximate in order to visualize on map.

Date of map imagery:  
January 09, 2009

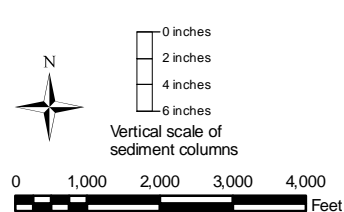
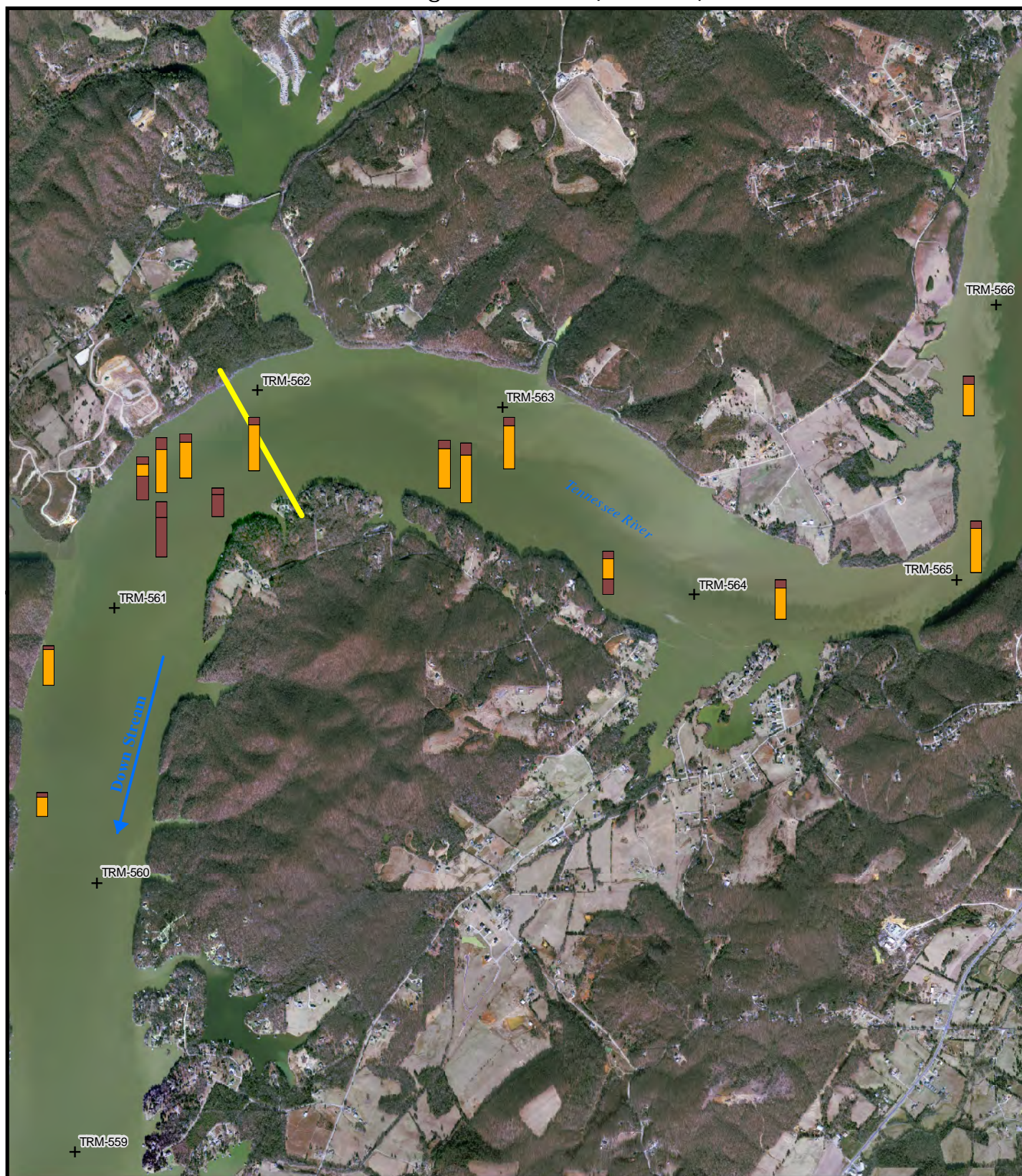
Core data:  
July 28 - August 5, 2009

Tennessee Valley Authority  
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36MS 822A 501-3 D  
10/08/2009

Figure 5

# Nature and Extent of Ash in the Tennessee River Bottom Downstream as of August 5, 2009 (Phase 1)



**Sediment Type**

- Ash
- Mixed (Ash and Native)
- Native
- Extent of Measurable Ash \*\*

\*\* Extent of Measurable Ash is defined as mostly contiguous ash that is at least 1/4 inch thick. Some samples beyond the extent line may contain traces of ash.

All sample points taken from box corer which has maximum recovery depth of 8 inches.

The locations of sediment columns depicted are approximate in order to visualize on map.

Date of map imagery:  
January 09, 2009

Core data:  
July 28 - August 5, 2009

Tennessee Valley Authority  
OE&R - ER&S  
Geographic Information & Engineering

36MS 822A 501-2 D  
10/08/2009

Figure 6