

**TSX/PAZ Satellite  
Update InSAR  
Subsidence  
September 23, 2023**

Longquist comment:

“The TSX satellite from the TSX/PAZ constellation (4 & 7-day revisit) passed by Sulphur on Saturday September 23. We received the dataset Monday and noted that the newest datapoint is continuing in the direction of the “recent” trends established in the prior supplementary update on the 9/16/2023 dataset. In that update we applied non-linear quadratic trends to the “historical” data (1/24/2023 - 8/3/2023) and the full dataset (1/24/2023 - 9/16/2023) for comparison.

In this update we have done the same for the historical dataset, but for the recent data trend calculation, we have reduced the data span to start on 3/24/2023. This resulted in a better trend line fit to the most recent data. The attached time series plots will replace the prior reporting method for the TSX/PAZ datasets going forward.

We have also appended a review of the distant “Additional” locations of interest to this report, where we are still seeing similar or greater acceleration increases.

Also, the SNT satellite passed over Sulphur on Friday September 22. Unfortunately, the image acquisition failed on that date and no data was collected. This happens periodically with the SNT satellite, but it has been a while with the prior failure having been in April 2022. No SNT report will be issued for 9/22/2023. TREA has told us that they are investigating the cause of the acquisition failure with their data procurement team and will get back to us once they have additional information.”



# TSX/PAZ Satellite Update

Continuous InSAR Monitoring of  
Ground Displacement  
Near Western Caverns and Dome Flank

## Sulphur Mines Salt Dome

Prepared for:  
**Westlake Chemical**

Prepared by:  
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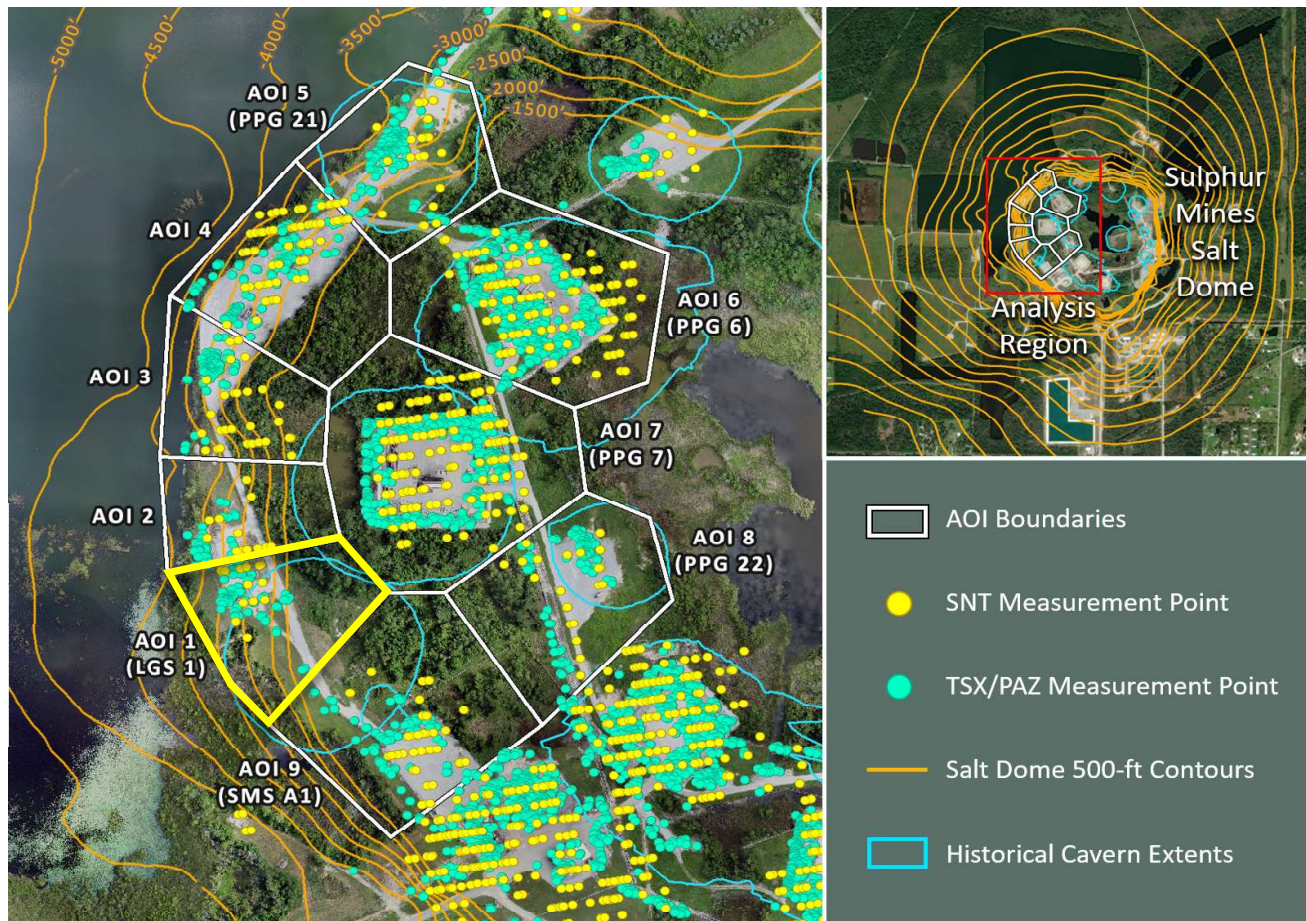
Date Signed: September 28, 2023  
Austin, Texas

Nathaniel L. Byars, P.E.  
Principal Engineer  
Louisiana License No. 40697

Dataset
Satellite Source
<b>TerraSAR-X - PAZ Constellation</b>
Most Recent Image Date
<b>Saturday, September 23, 2023</b>

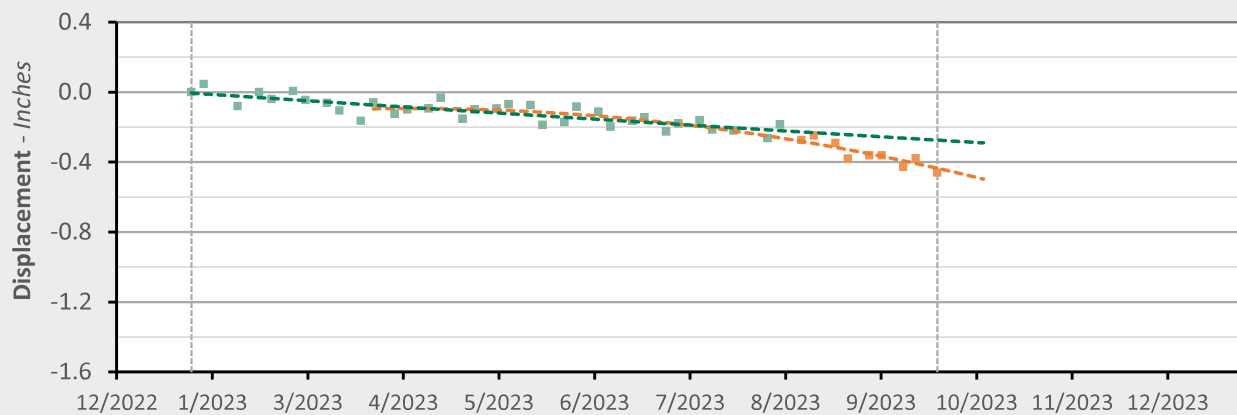
Analysis Report Date:  
**September 28, 2023**

## AOI 1 (LGS 1) - Location Map



## AOI 1 (LGS 1) - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 77



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	-0.39 in/yr	-1.46 in/yr	-1.06 in/yr
Acceleration:	+0.06 in/yr <sup>2</sup>	-3.11 in/yr <sup>2</sup>	-3.18 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

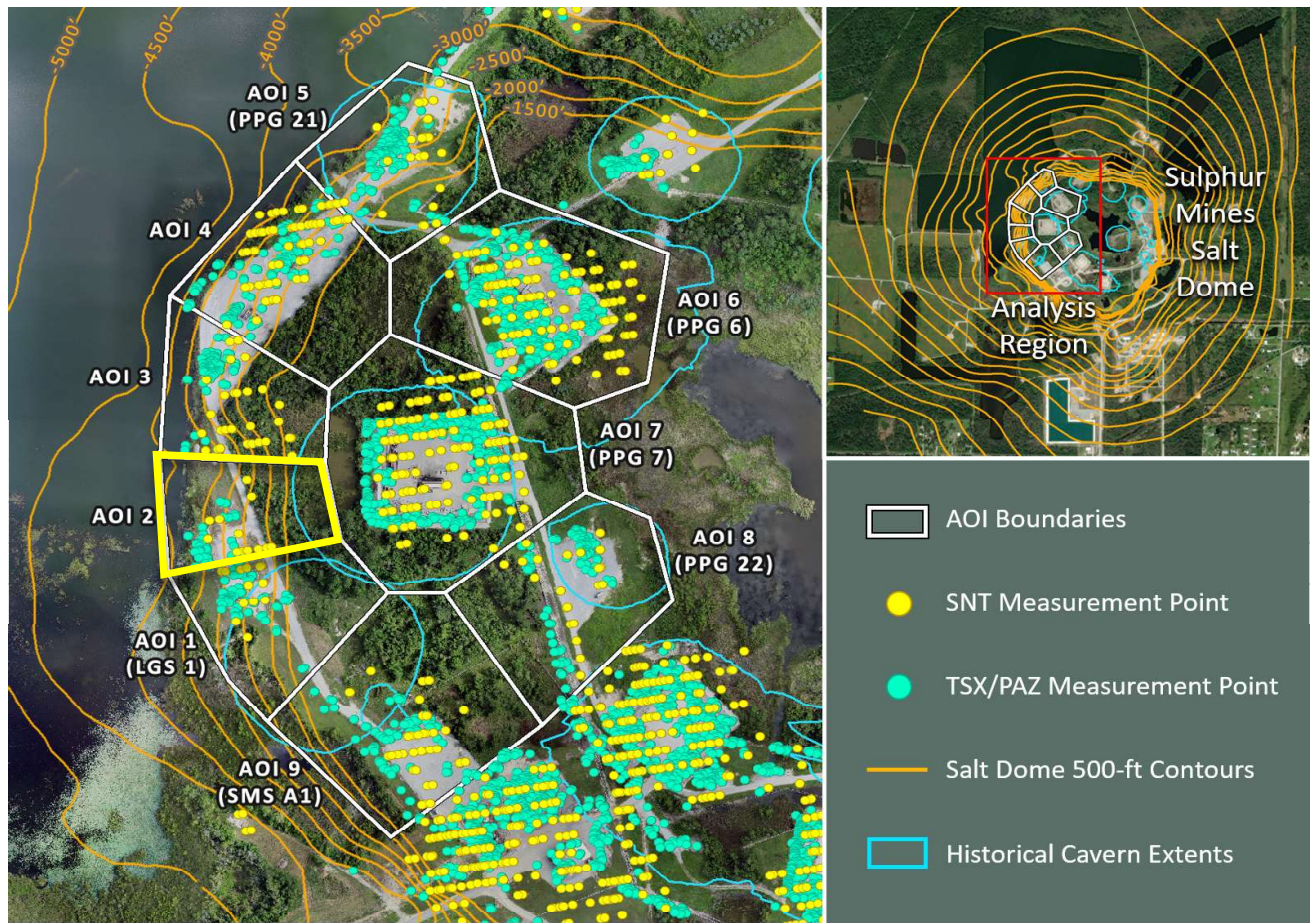
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)

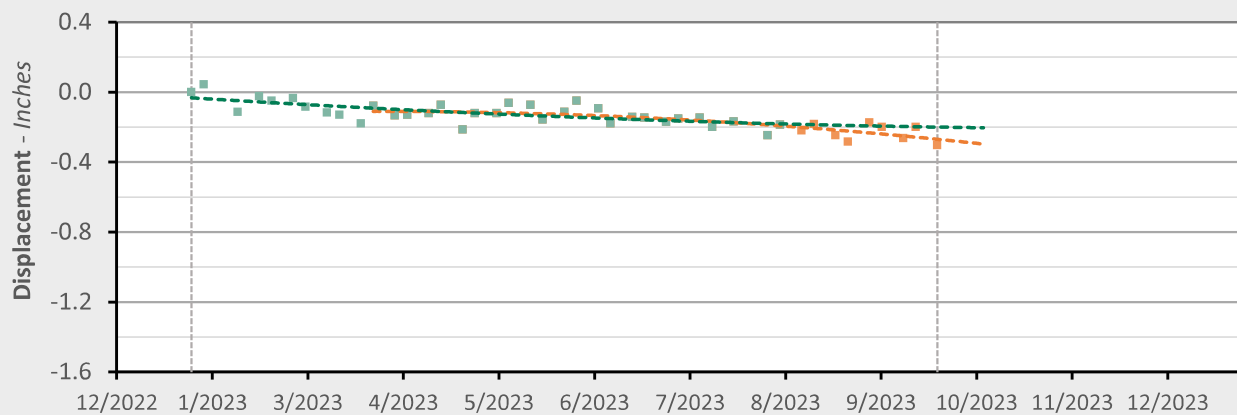


## AOI 2 - Location Map



## AOI 2 - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 42



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	-0.17 in/yr	-0.64 in/yr	-0.48 in/yr
Acceleration:	+0.45 in/yr <sup>2</sup>	-1.29 in/yr <sup>2</sup>	-1.74 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

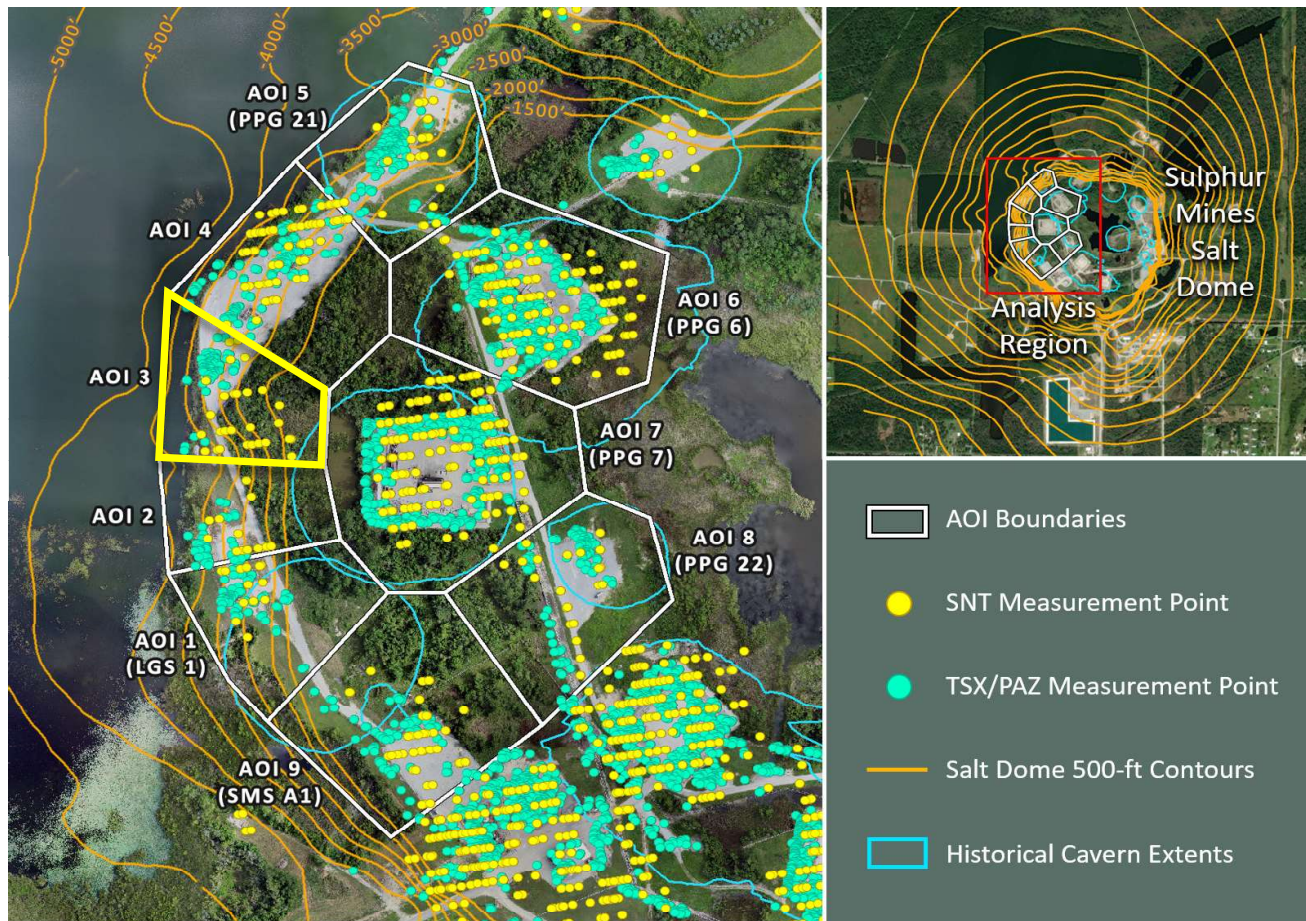
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)

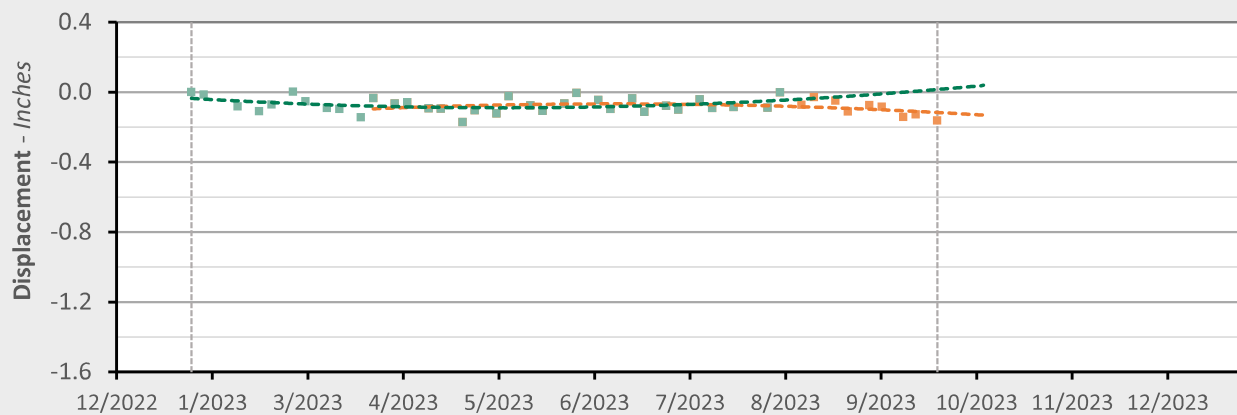


## AOI 3 - Location Map



## AOI 3 - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 81



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	+0.34 in/yr	-0.34 in/yr	-0.69 in/yr
Acceleration:	+1.40 in/yr <sup>2</sup>	-1.21 in/yr <sup>2</sup>	-2.61 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

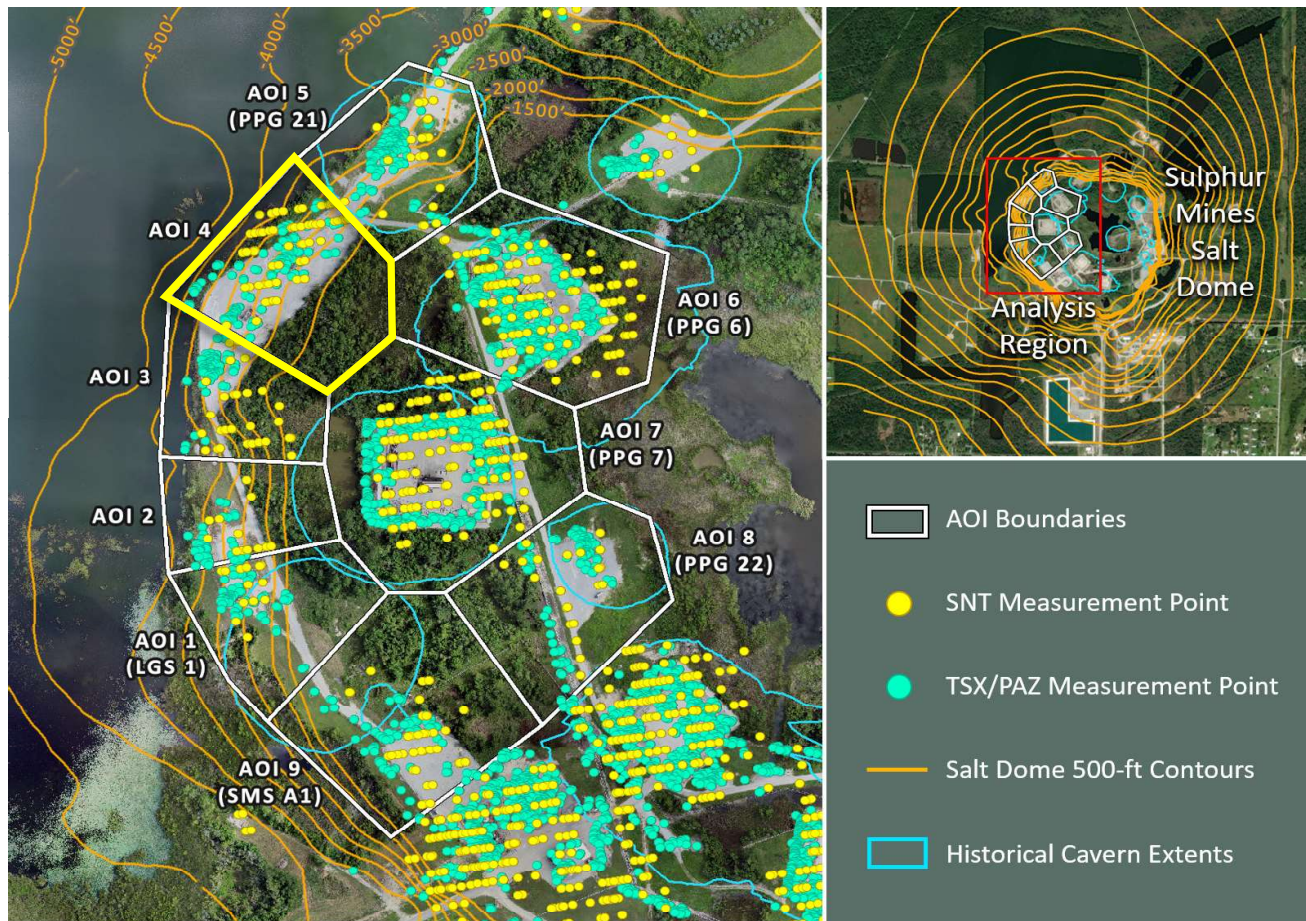
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)

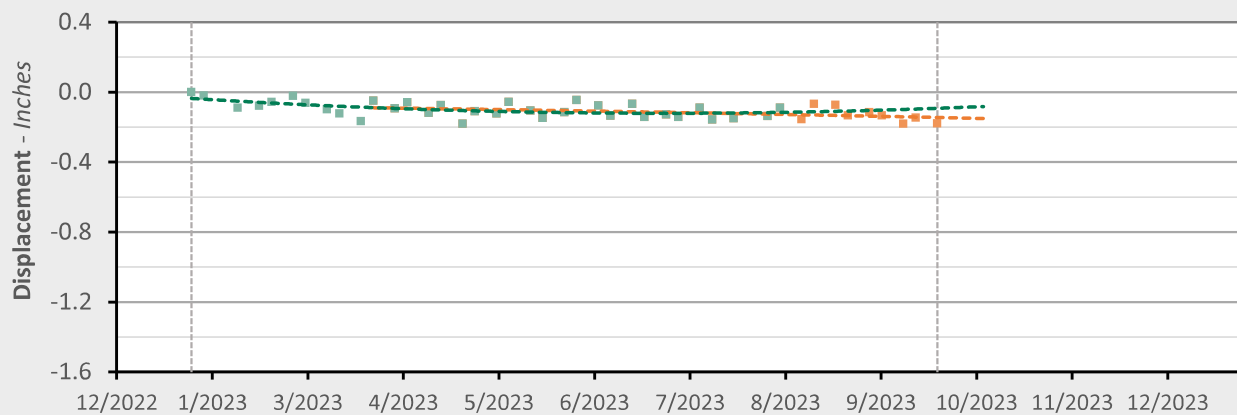


## AOI 4 - Location Map



## AOI 4 - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 140



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	+0.10 in/yr	-0.13 in/yr	-0.23 in/yr
Acceleration:	+0.97 in/yr <sup>2</sup>	-0.09 in/yr <sup>2</sup>	-1.06 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

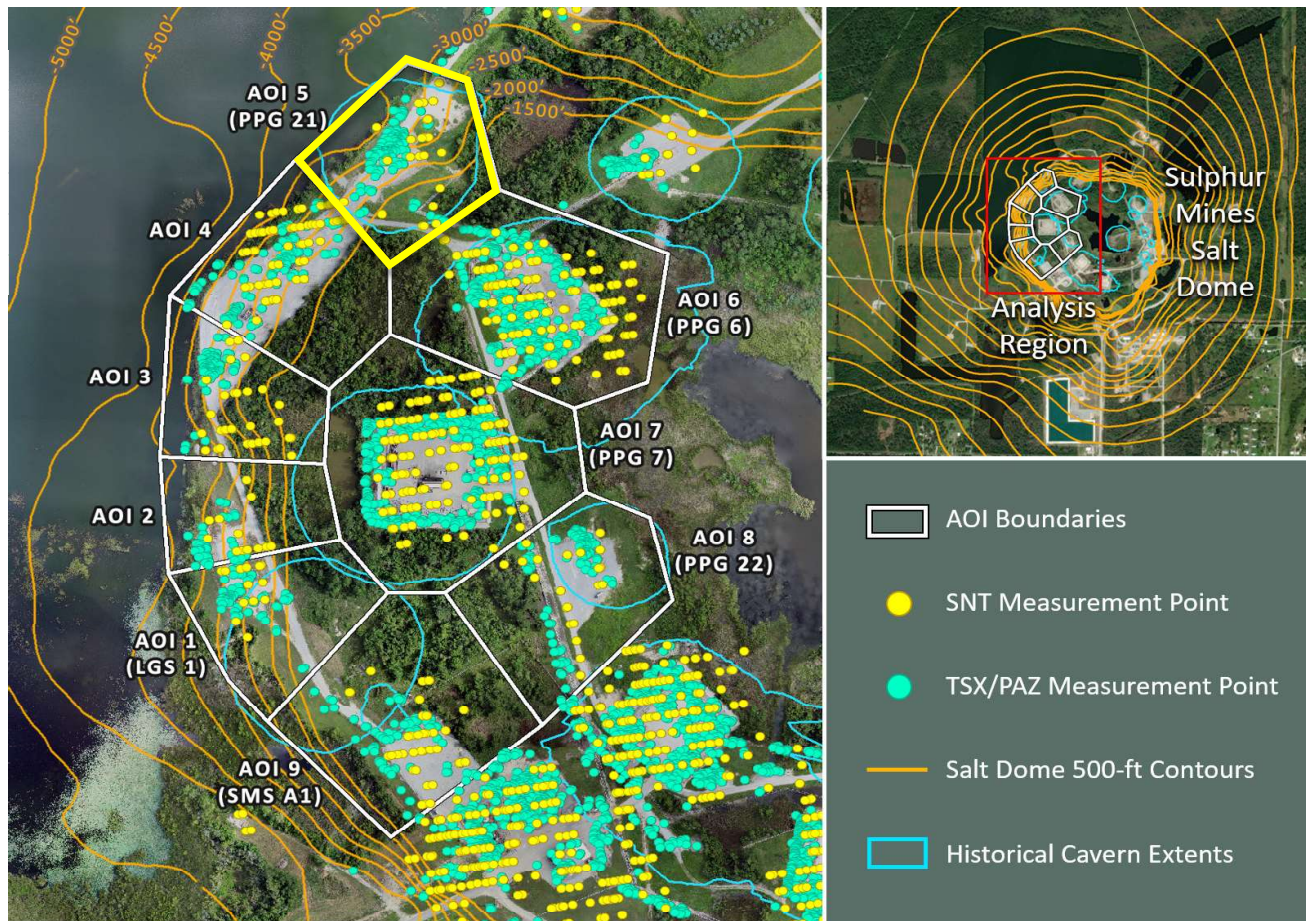
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

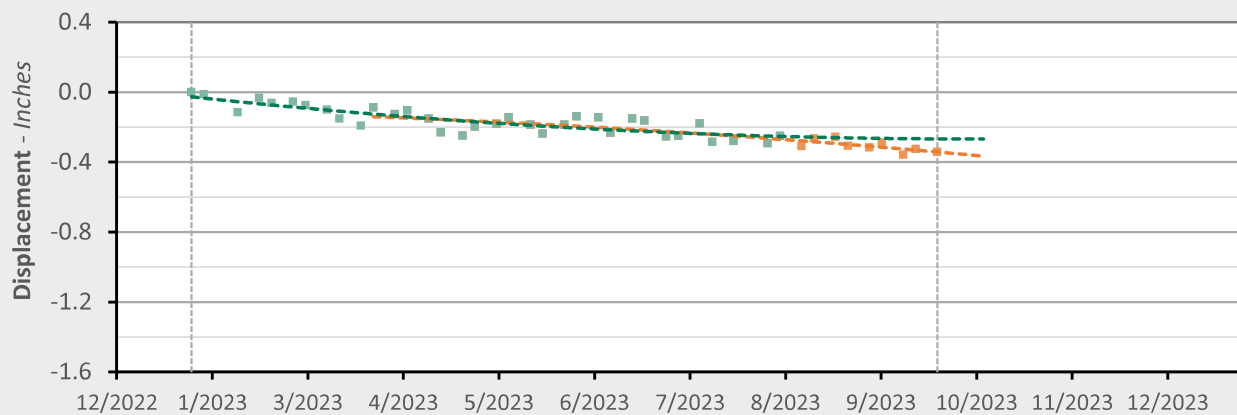
--- Recent Trend Line (Quadratic Regression)



## AOI 5 (PPG 21) - Location Map



## AOI 5 (PPG 21) - Displacement Time Series TSX/PAZ (9/23/2023) Point Count: 136



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	-0.17 in/yr	-0.57 in/yr	-0.39 in/yr
Acceleration:	+0.99 in/yr <sup>2</sup>	-0.66 in/yr <sup>2</sup>	-1.65 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

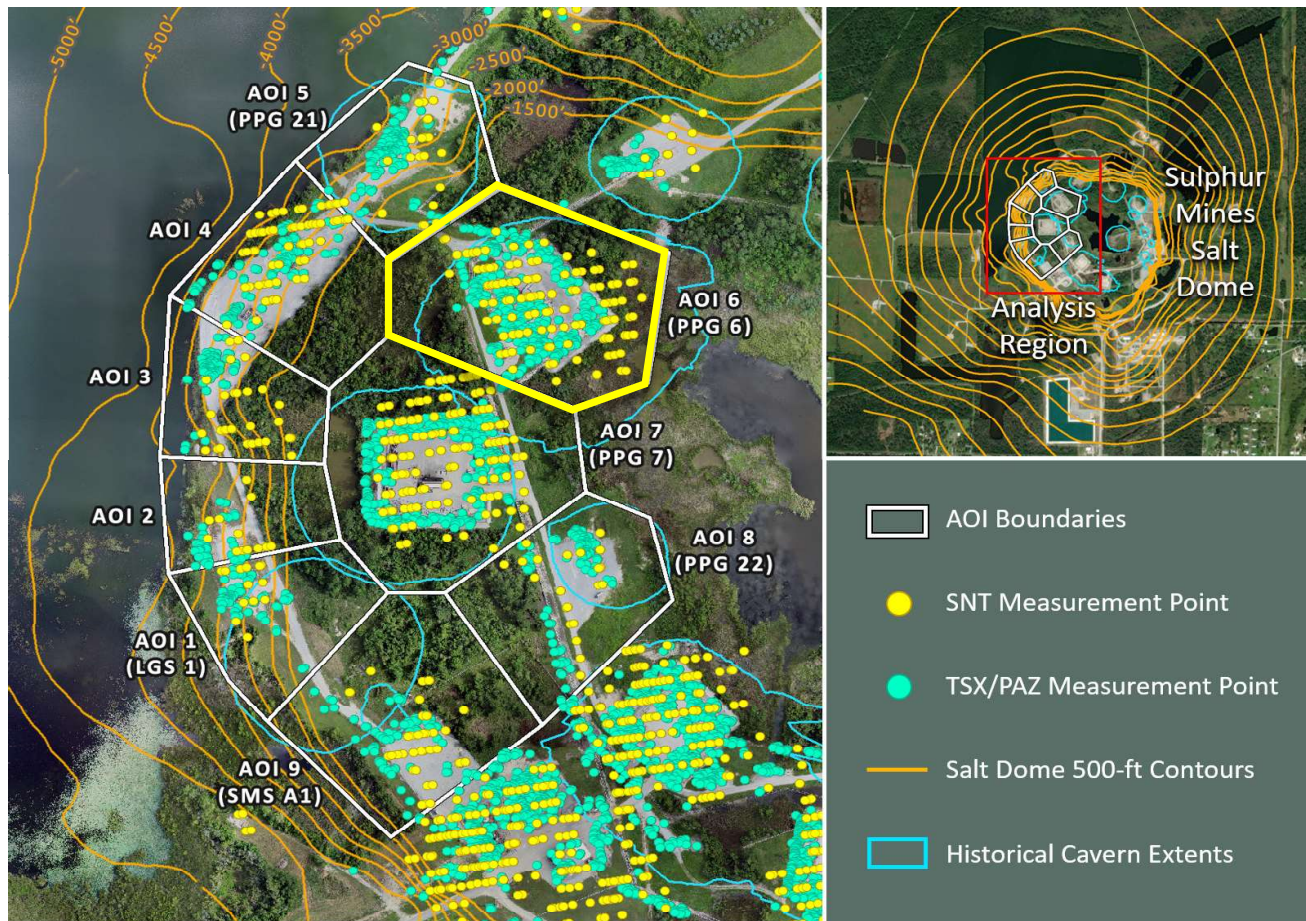
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)

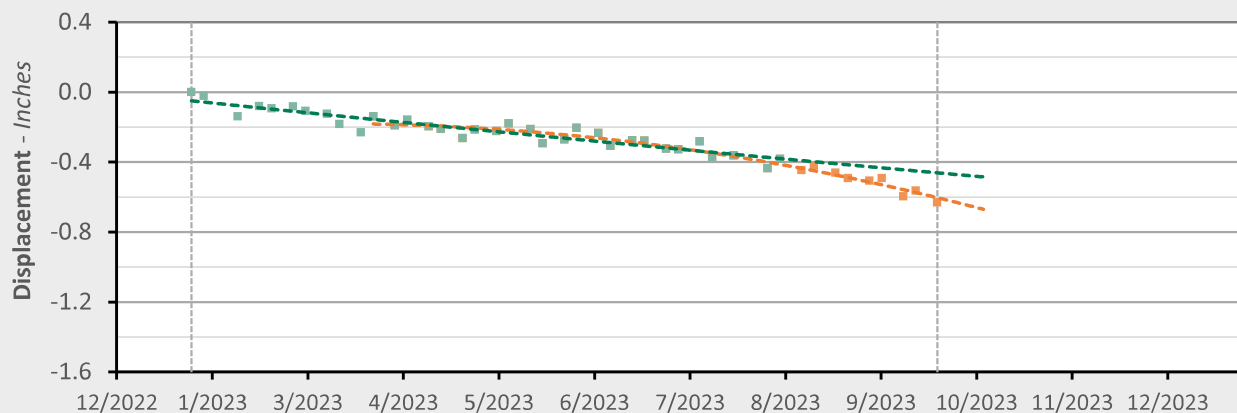


## AOI 6 (PPG 6) - Location Map



## AOI 6 (PPG 6) - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: **428**



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	-0.59 in/yr	-1.57 in/yr	-0.97 in/yr
Acceleration:	+0.14 in/yr <sup>2</sup>	-2.90 in/yr <sup>2</sup>	-3.04 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

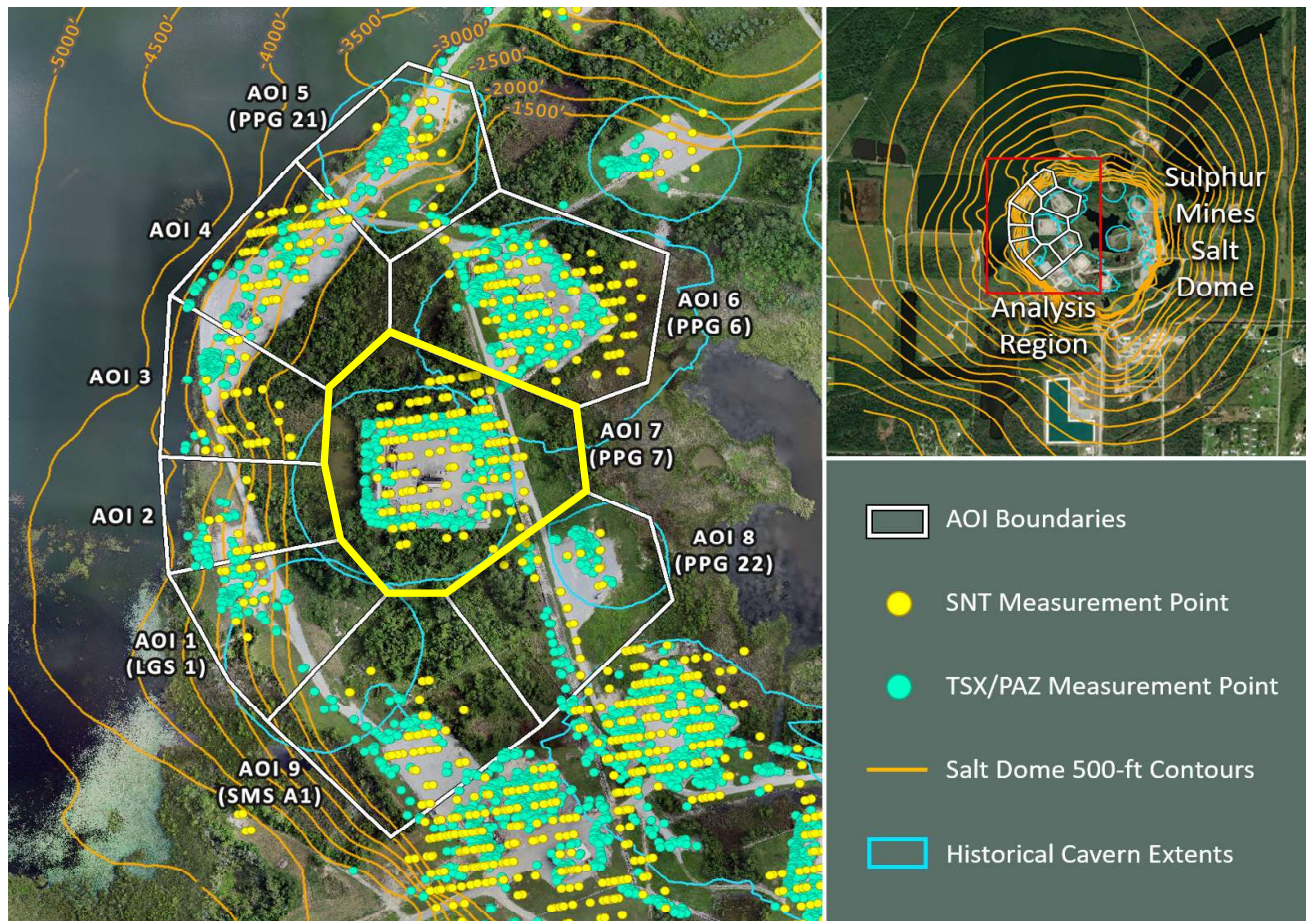
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

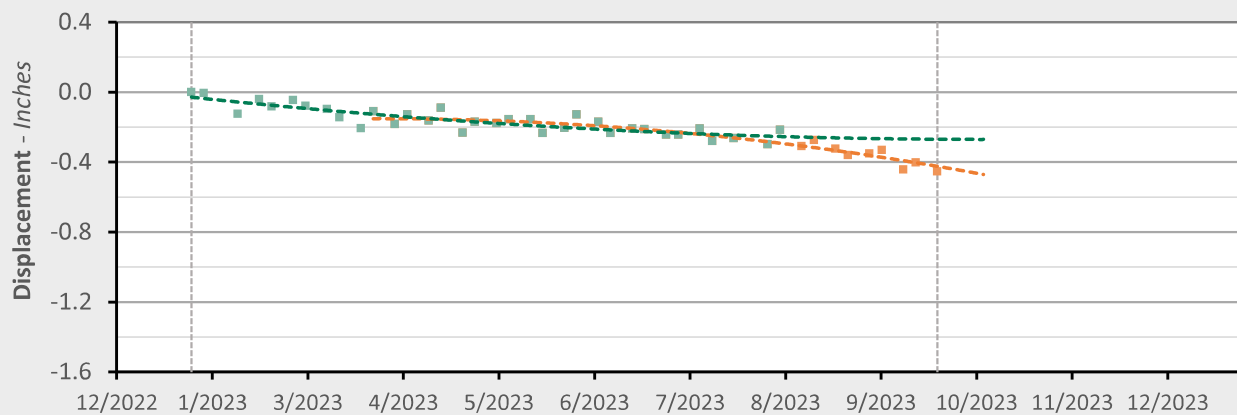
--- Recent Trend Line (Quadratic Regression)



## AOI 7 (PPG 7) - Location Map



## AOI 7 (PPG 7) - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: **374**

	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	-0.18 in/yr	-1.10 in/yr	-0.92 in/yr
Acceleration:	+0.96 in/yr <sup>2</sup>	-2.22 in/yr <sup>2</sup>	-3.18 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

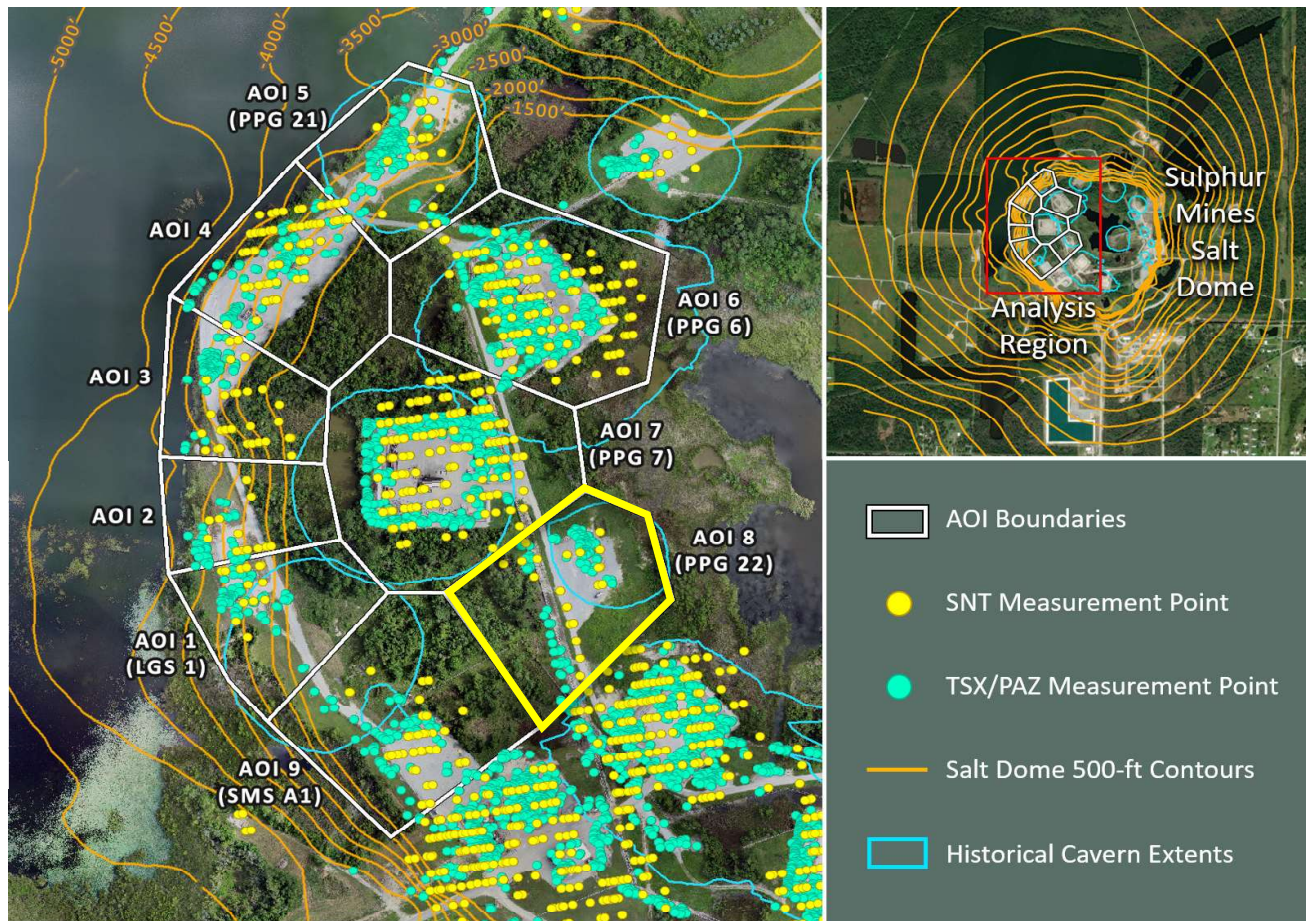
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

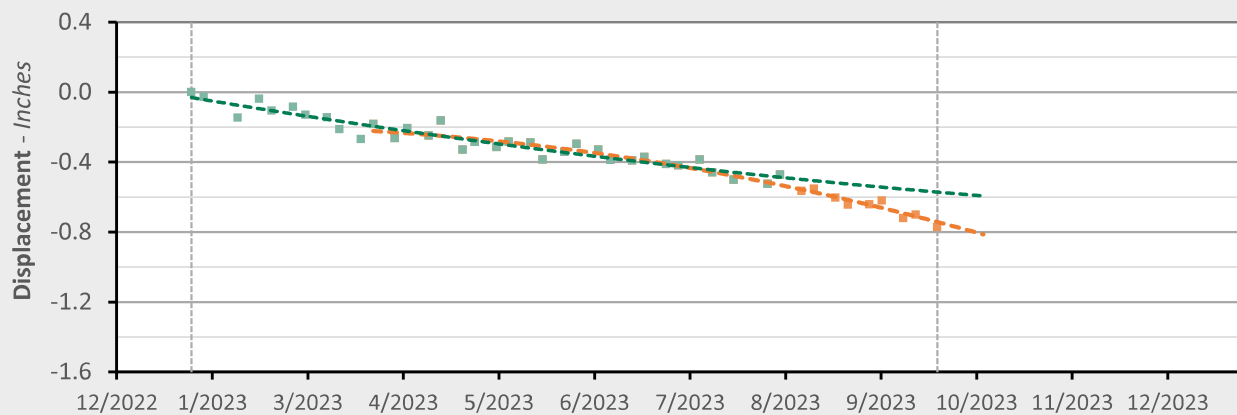
--- Recent Trend Line (Quadratic Regression)



## AOI 8 (PPG 22) - Location Map



## AOI 8 (PPG 22) - Displacement Time Series TSX/PAZ (9/23/2023) Point Count: 111

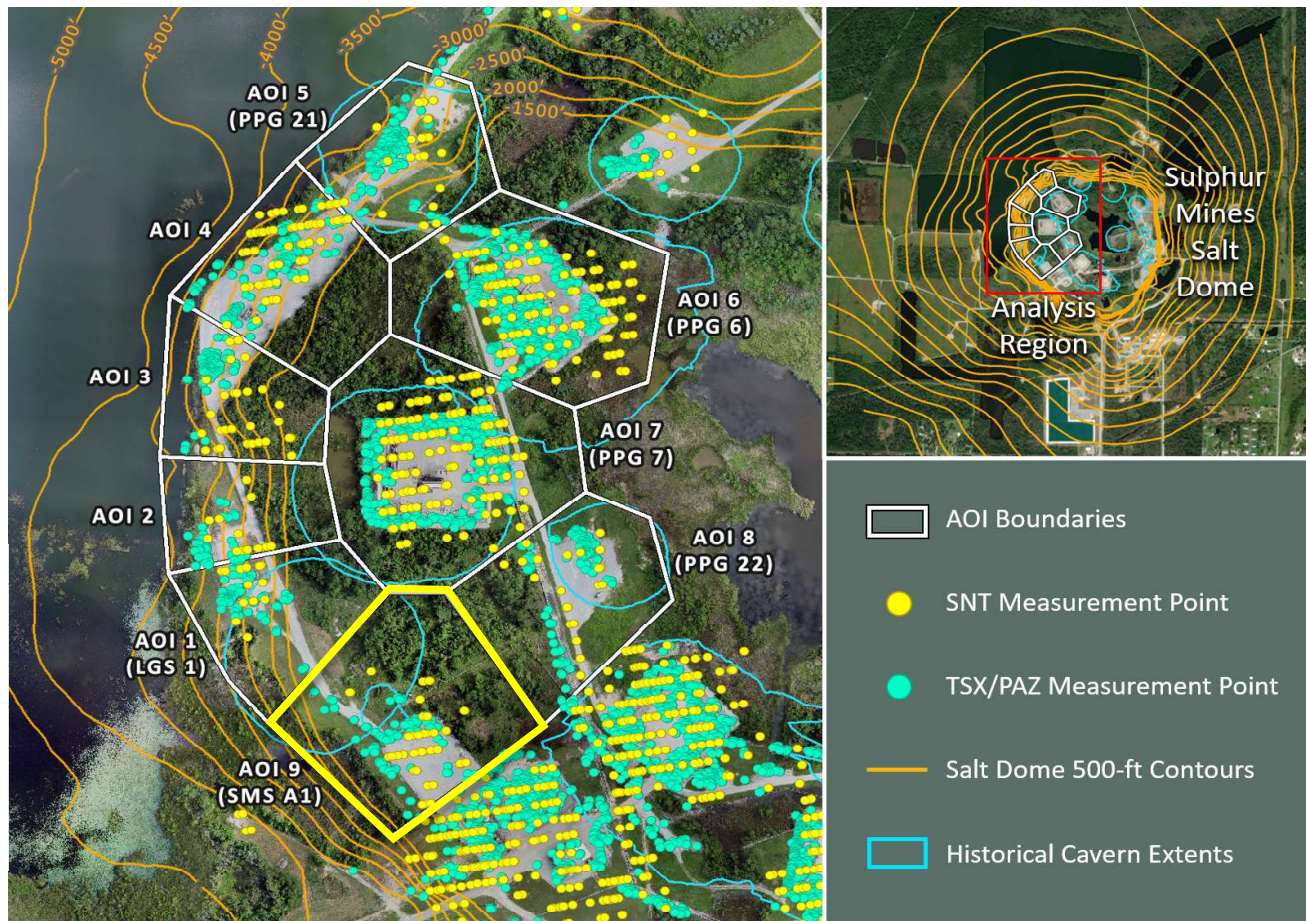


	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	-0.66 in/yr	-1.69 in/yr	-1.03 in/yr
Acceleration:	+0.80 in/yr <sup>2</sup>	-2.62 in/yr <sup>2</sup>	-3.42 in/yr <sup>2</sup>

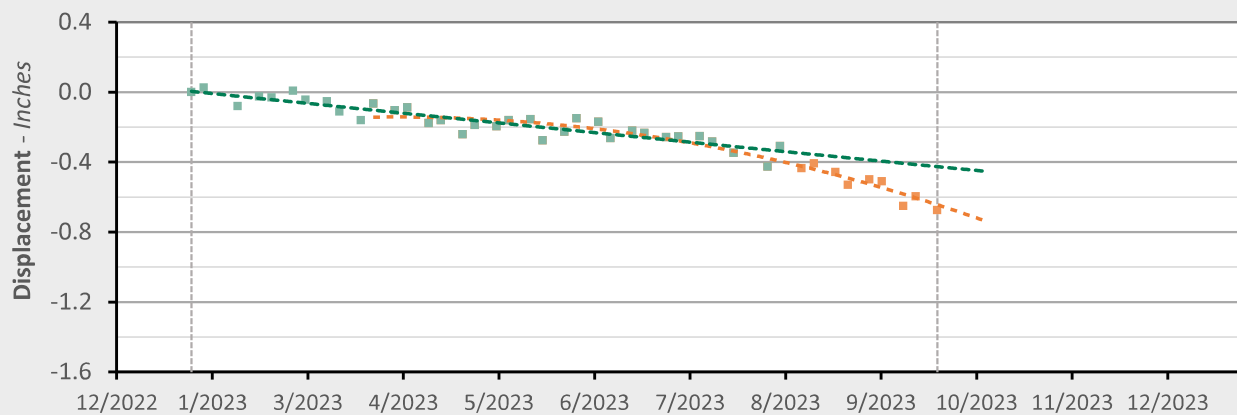
■ Historical LOS Displacement Measurement    
 --- Historical Trend Line (Quadratic Regression)    
 ■ Recent LOS Displacement Measurement    
 --- Recent Trend Line (Quadratic Regression)



## AOI 9 (PPG A1) - Location Map



## AOI 9 (SMS A1) - Displacement Time Series TSX/PAZ (9/23/2023) Point Count: 85

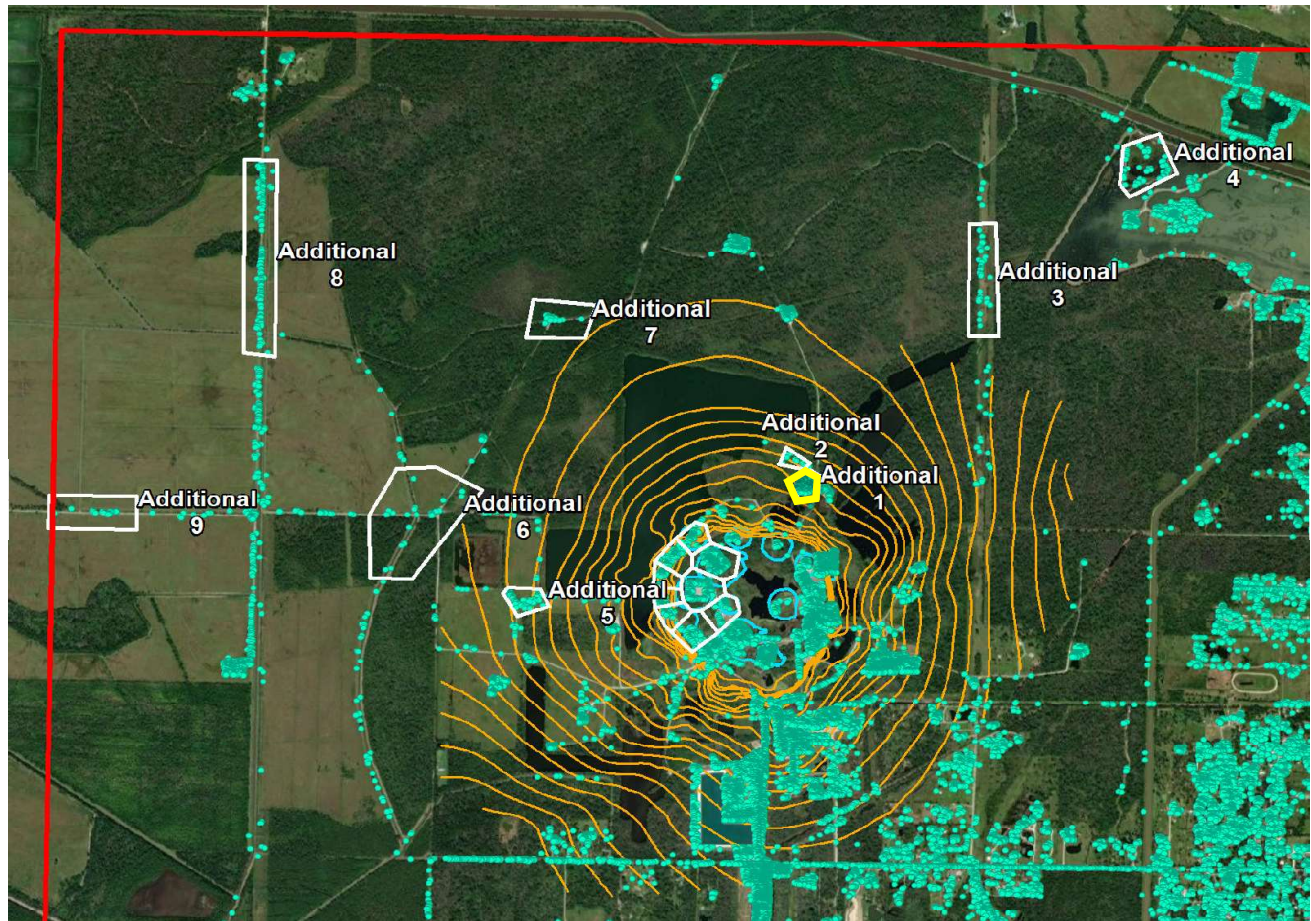


	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	-0.64 in/yr	-2.09 in/yr	-1.45 in/yr
Acceleration:	+0.06 in/yr <sup>2</sup>	-4.35 in/yr <sup>2</sup>	-4.41 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement    
 --- Historical Trend Line (Quadratic Regression)    
 ■ Recent LOS Displacement Measurement    
 --- Recent Trend Line (Quadratic Regression)

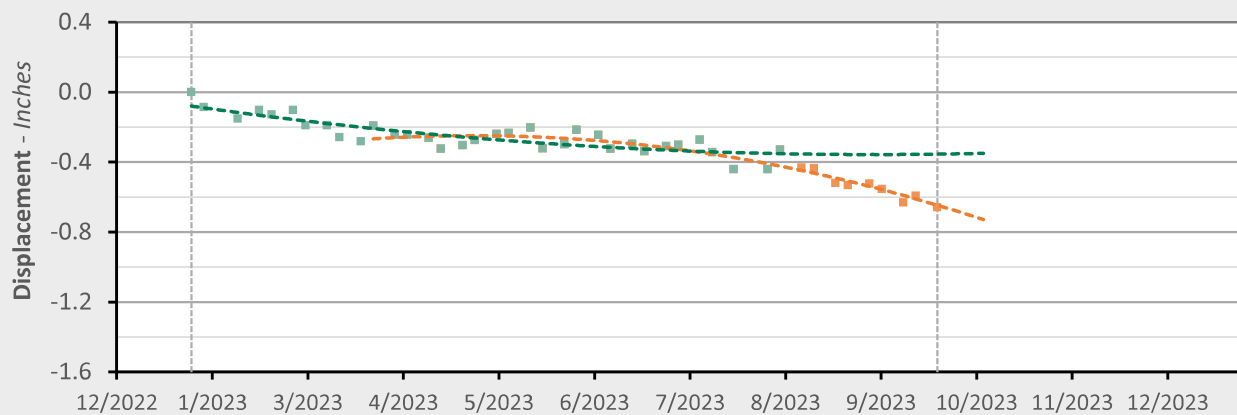


## Additional 1 - Location Map



## Additional 1 - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 135



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	-0.12 in/yr	-1.93 in/yr	-1.80 in/yr
Acceleration:	+1.51 in/yr <sup>2</sup>	-4.67 in/yr <sup>2</sup>	-6.18 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

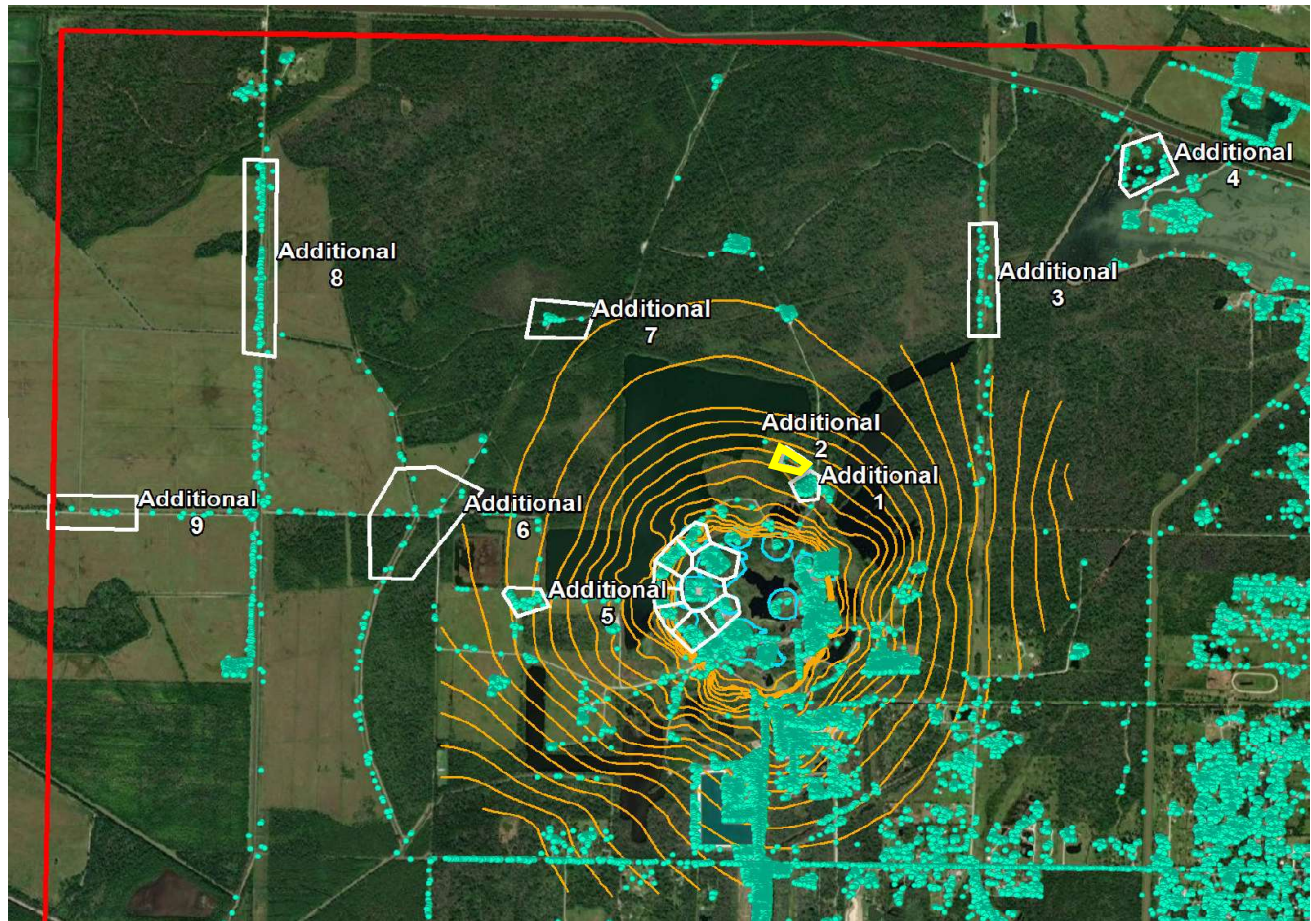
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)

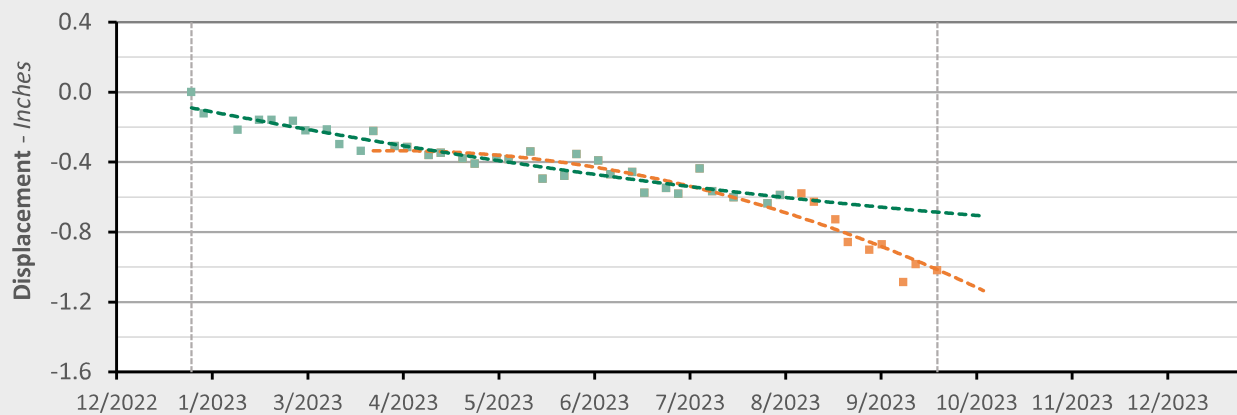


## Additional 2 - Location Map



## Additional 2 - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 18



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	-0.70 in/yr	-2.81 in/yr	-2.11 in/yr
Acceleration:	+1.06 in/yr <sup>2</sup>	-5.79 in/yr <sup>2</sup>	-6.85 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

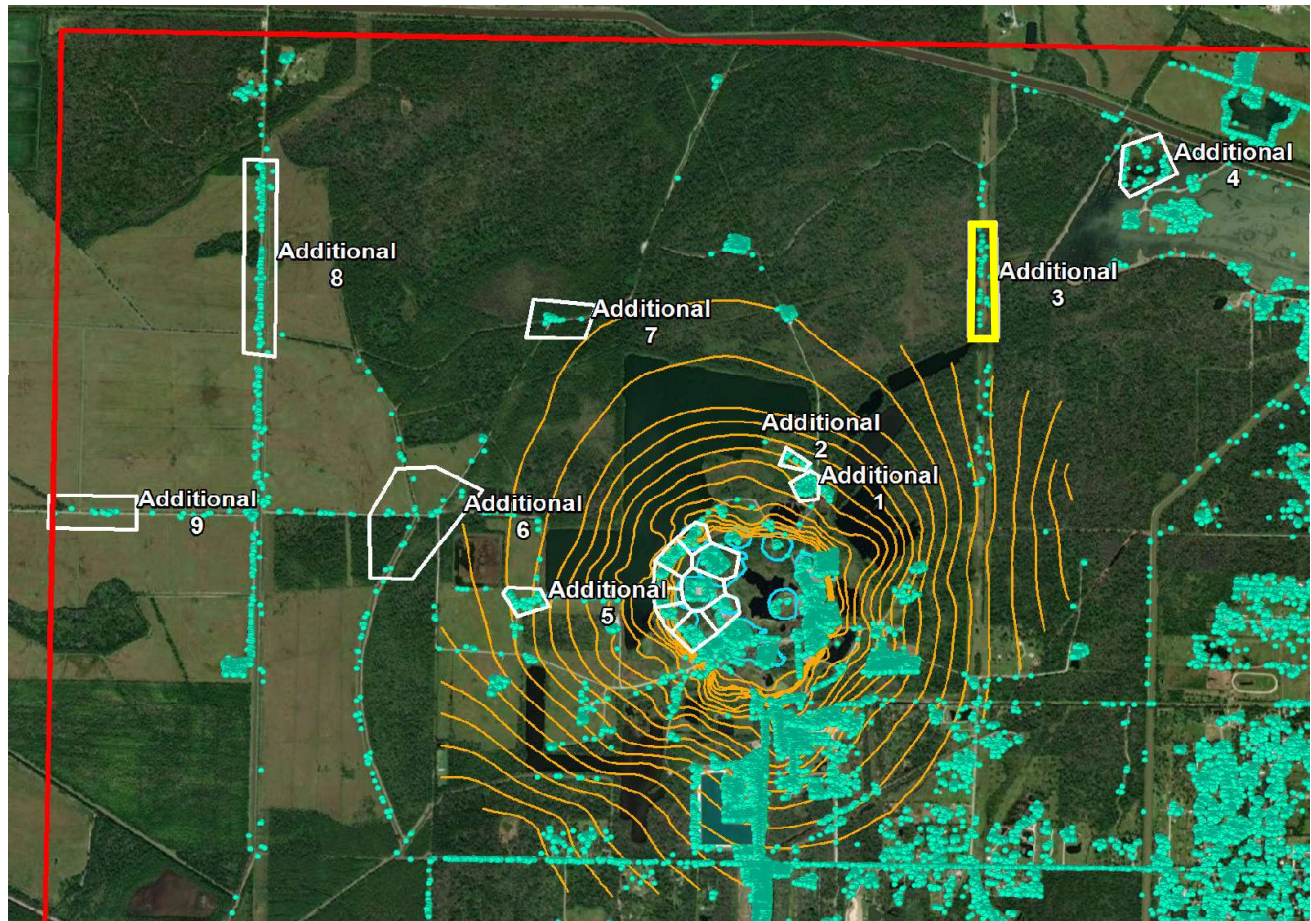
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)

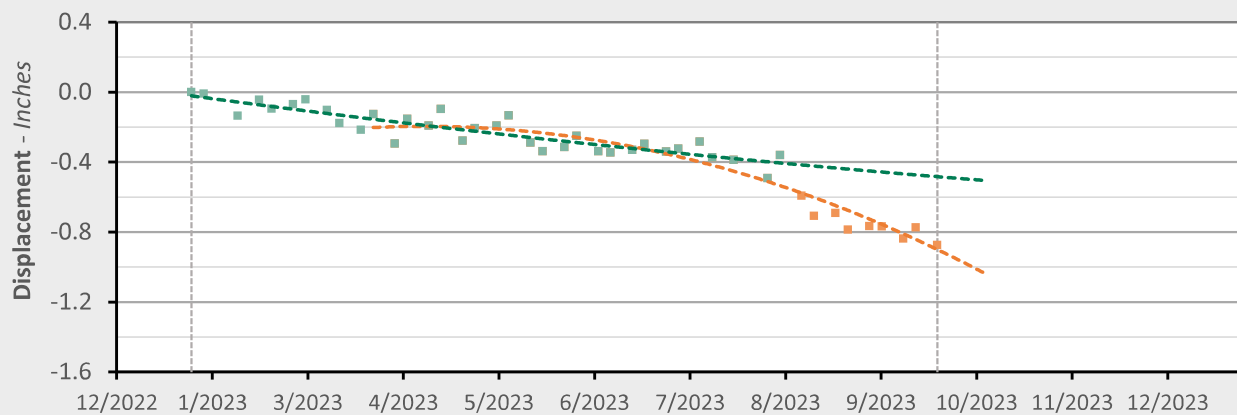


## Additional 3 - Location Map



## Additional 3 - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 40



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	-0.60 in/yr	-3.09 in/yr	-2.49 in/yr
Acceleration:	+0.52 in/yr <sup>2</sup>	-6.77 in/yr <sup>2</sup>	-7.29 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

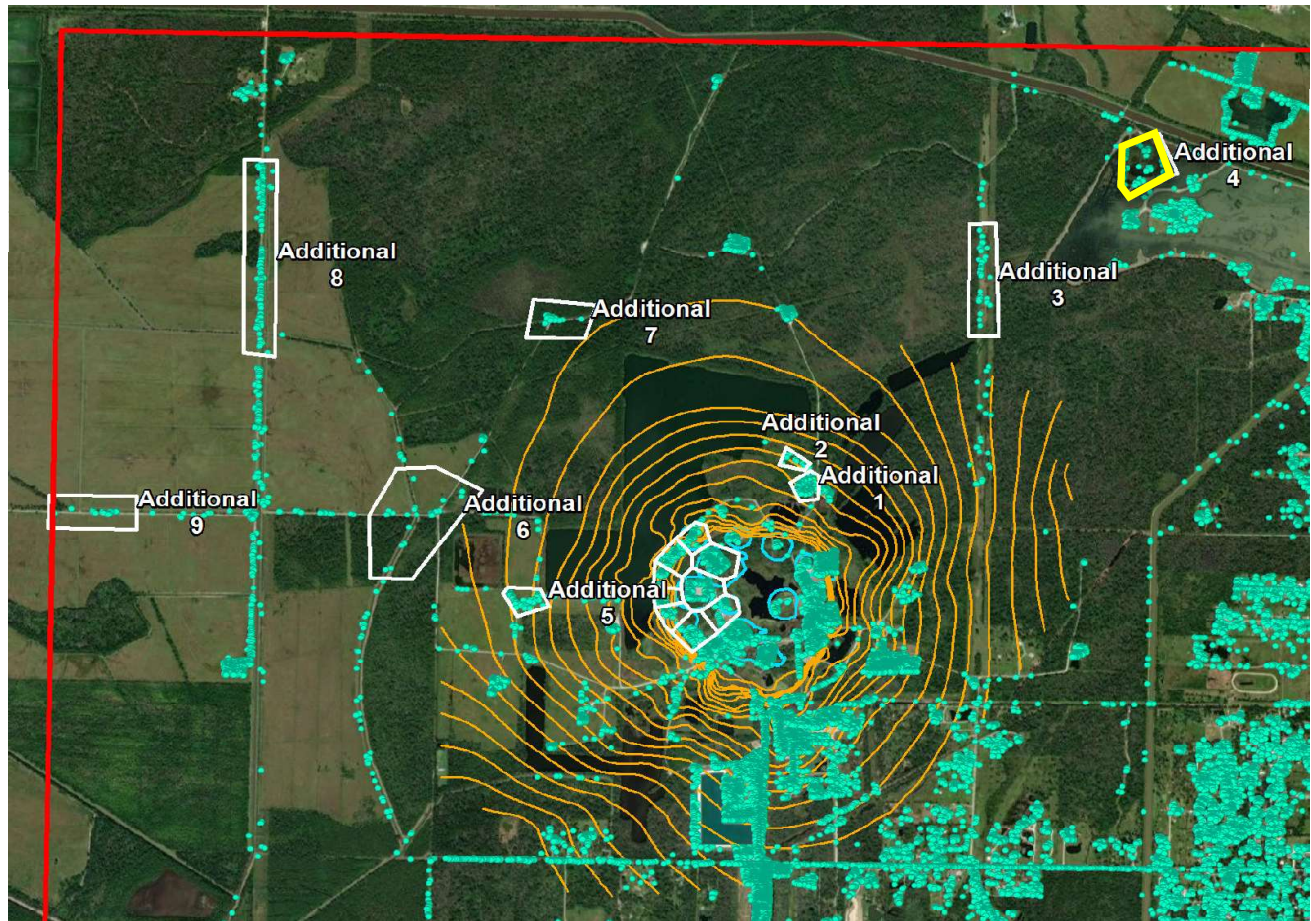
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)

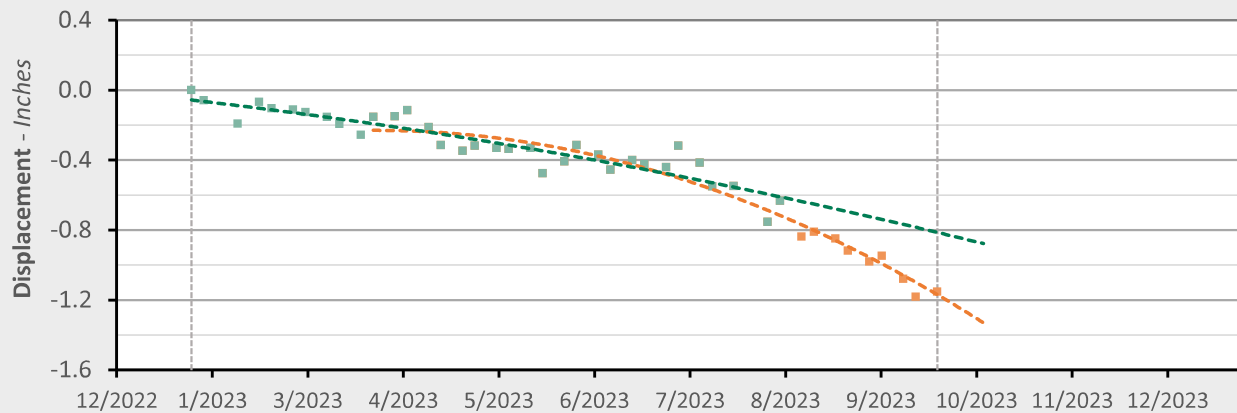


## Additional 4 - Location Map



## Additional 4 - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 71



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	-1.37 in/yr	-3.77 in/yr	-2.40 in/yr
Acceleration:	-1.21 in/yr <sup>2</sup>	-7.57 in/yr <sup>2</sup>	-6.36 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

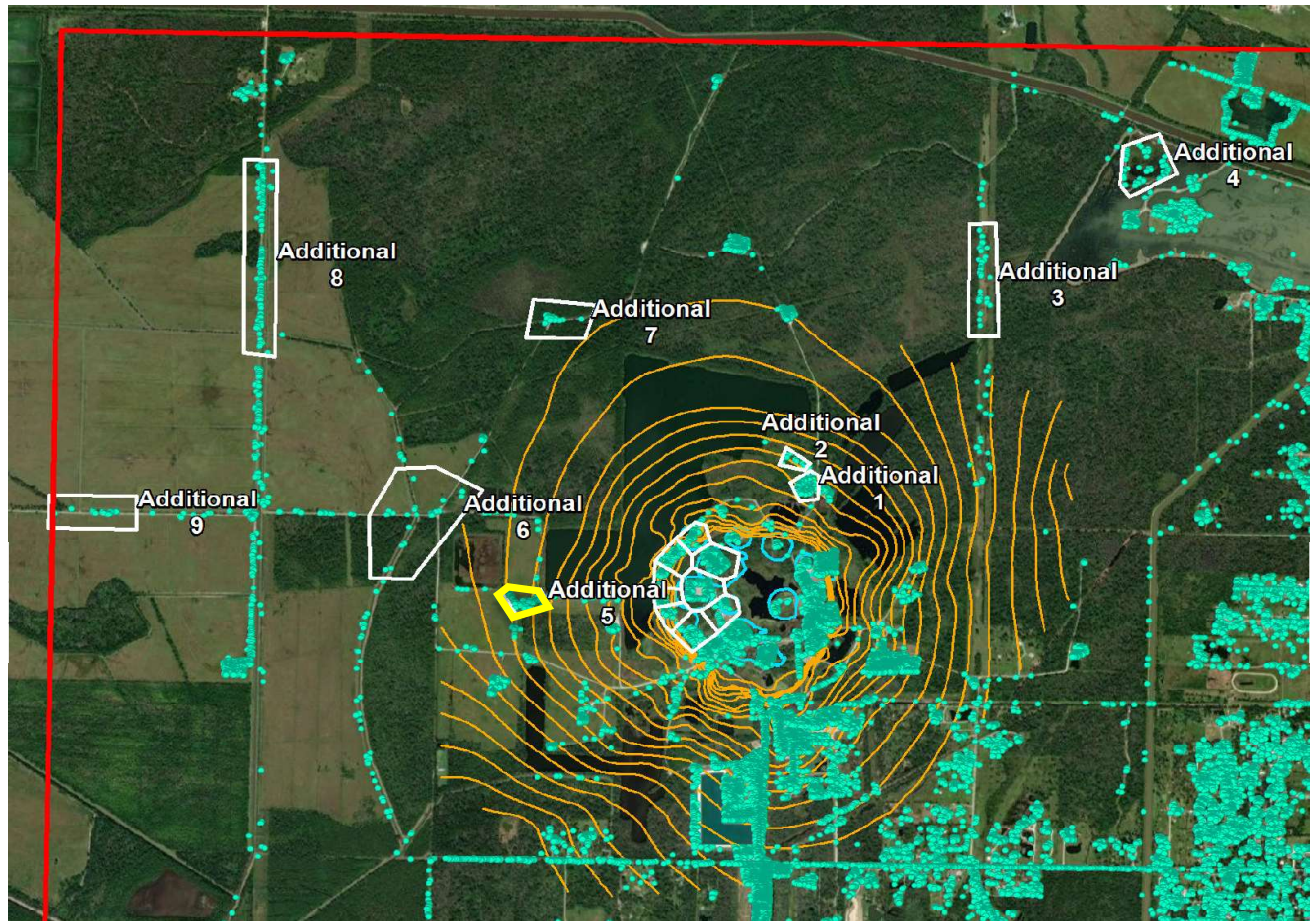
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)

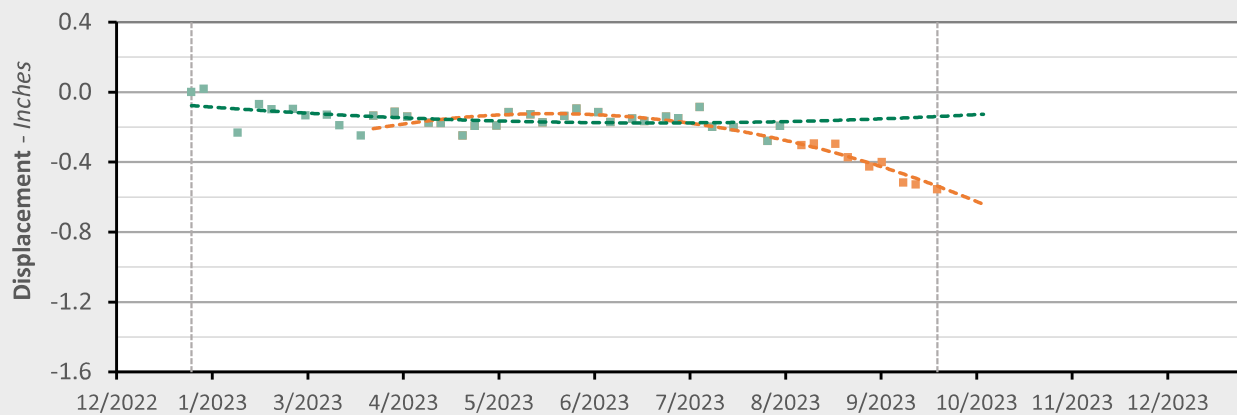


## Additional 5 - Location Map



## Additional 5 - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 76



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	+0.13 in/yr	-2.41 in/yr	-2.53 in/yr
Acceleration:	+1.17 in/yr <sup>2</sup>	-6.99 in/yr <sup>2</sup>	-8.15 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

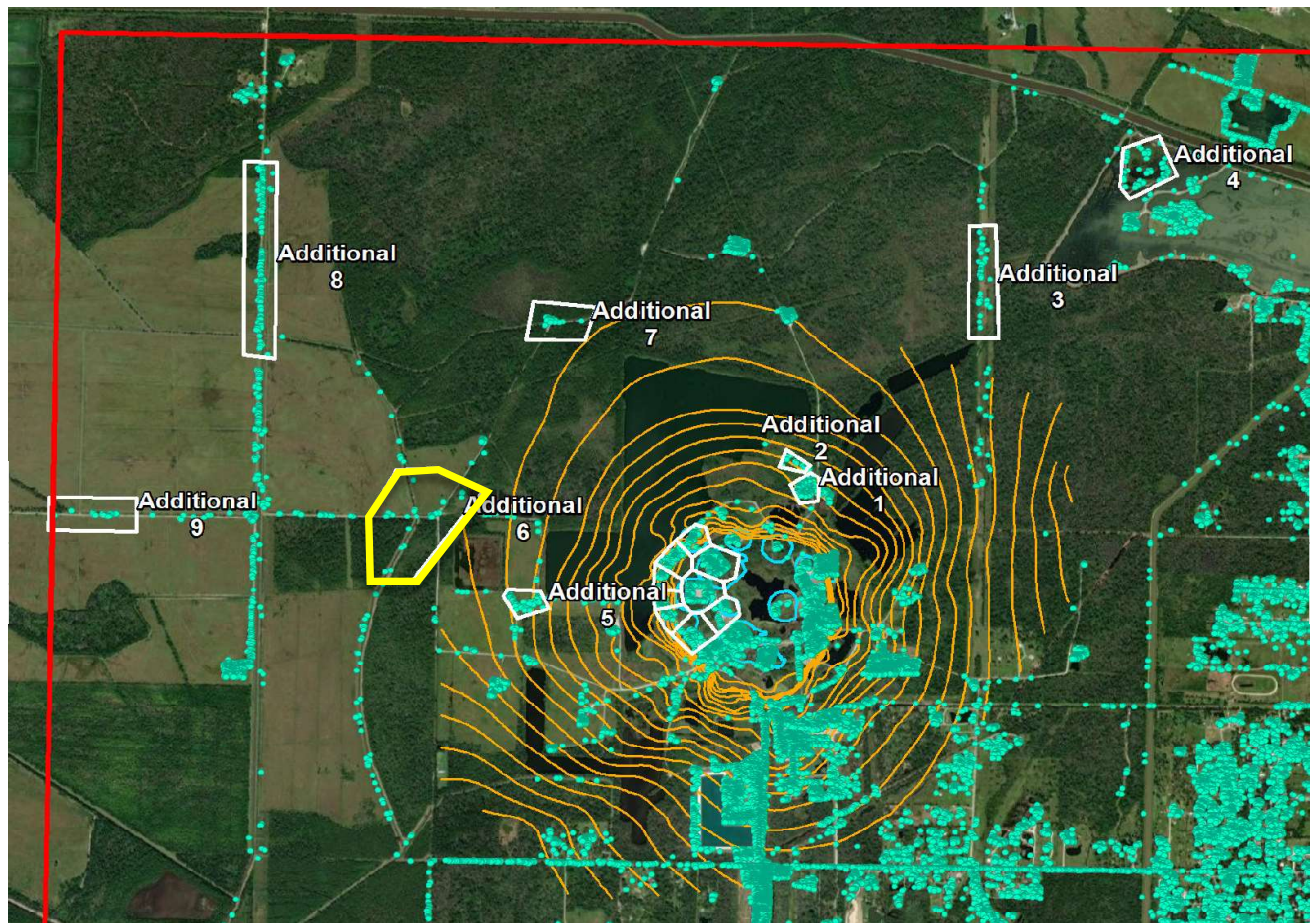
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)

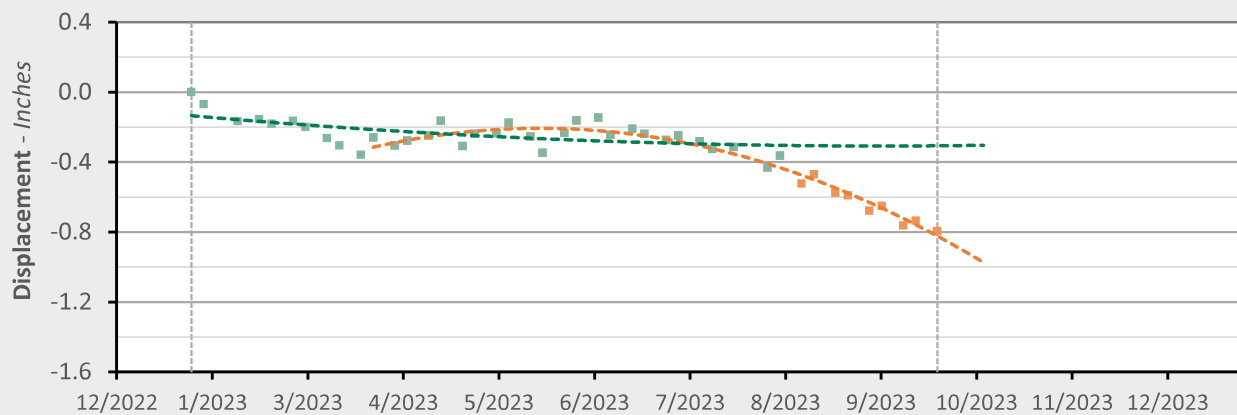


## Additional 6 - Location Map



## Additional 6 - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 24



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	-0.08 in/yr	-3.49 in/yr	-3.40 in/yr
Acceleration:	+0.92 in/yr <sup>2</sup>	-9.87 in/yr <sup>2</sup>	-10.79 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

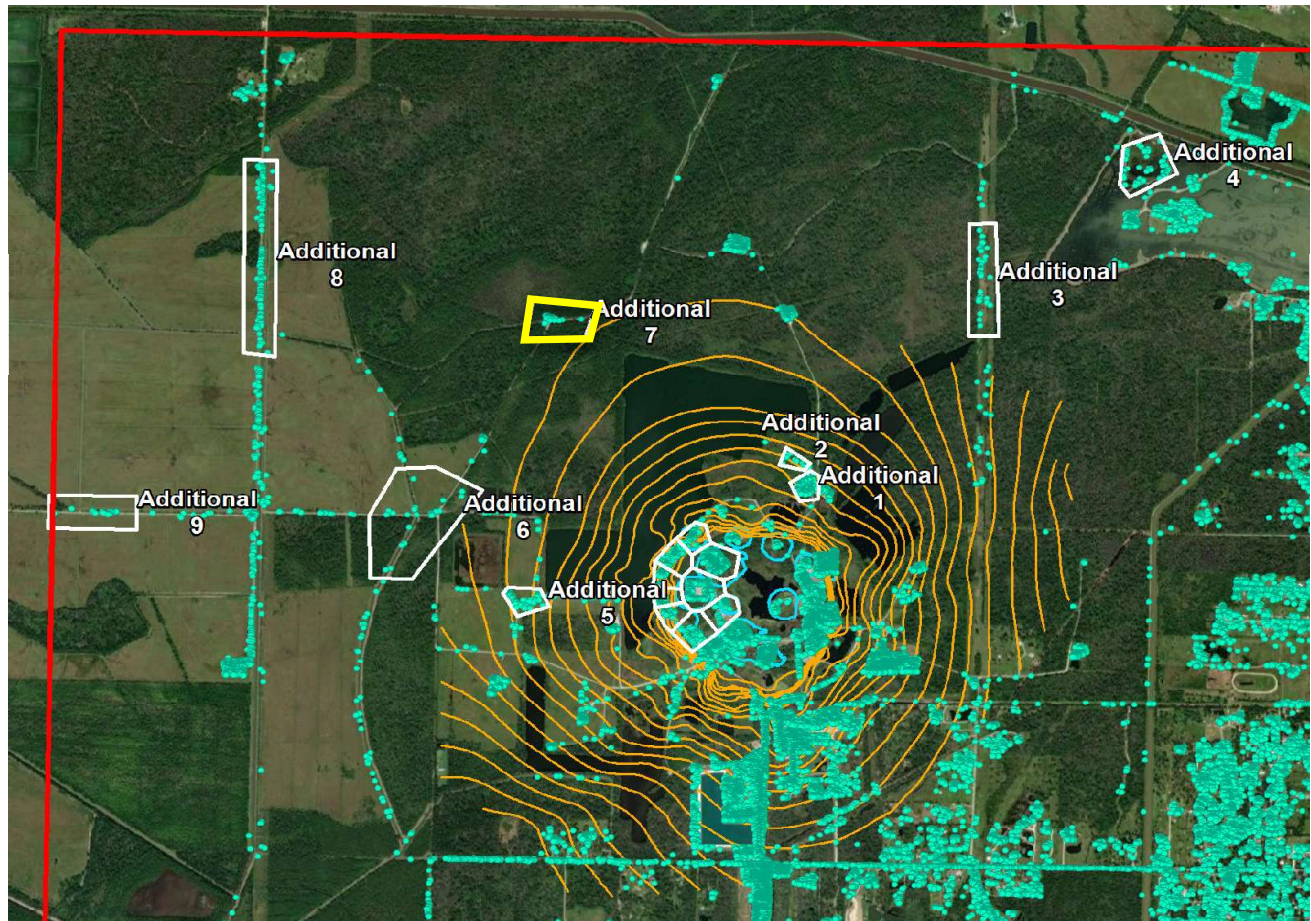
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)

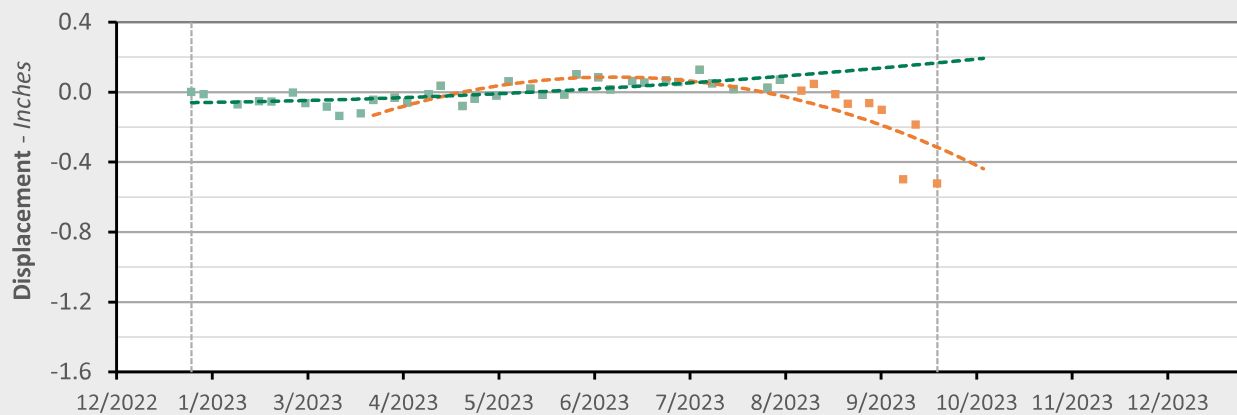


## Additional 7 - Location Map



## Additional 7 - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 26



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	+0.50 in/yr	-2.79 in/yr	-3.28 in/yr
Acceleration:	+0.80 in/yr <sup>2</sup>	-9.67 in/yr <sup>2</sup>	-10.47 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

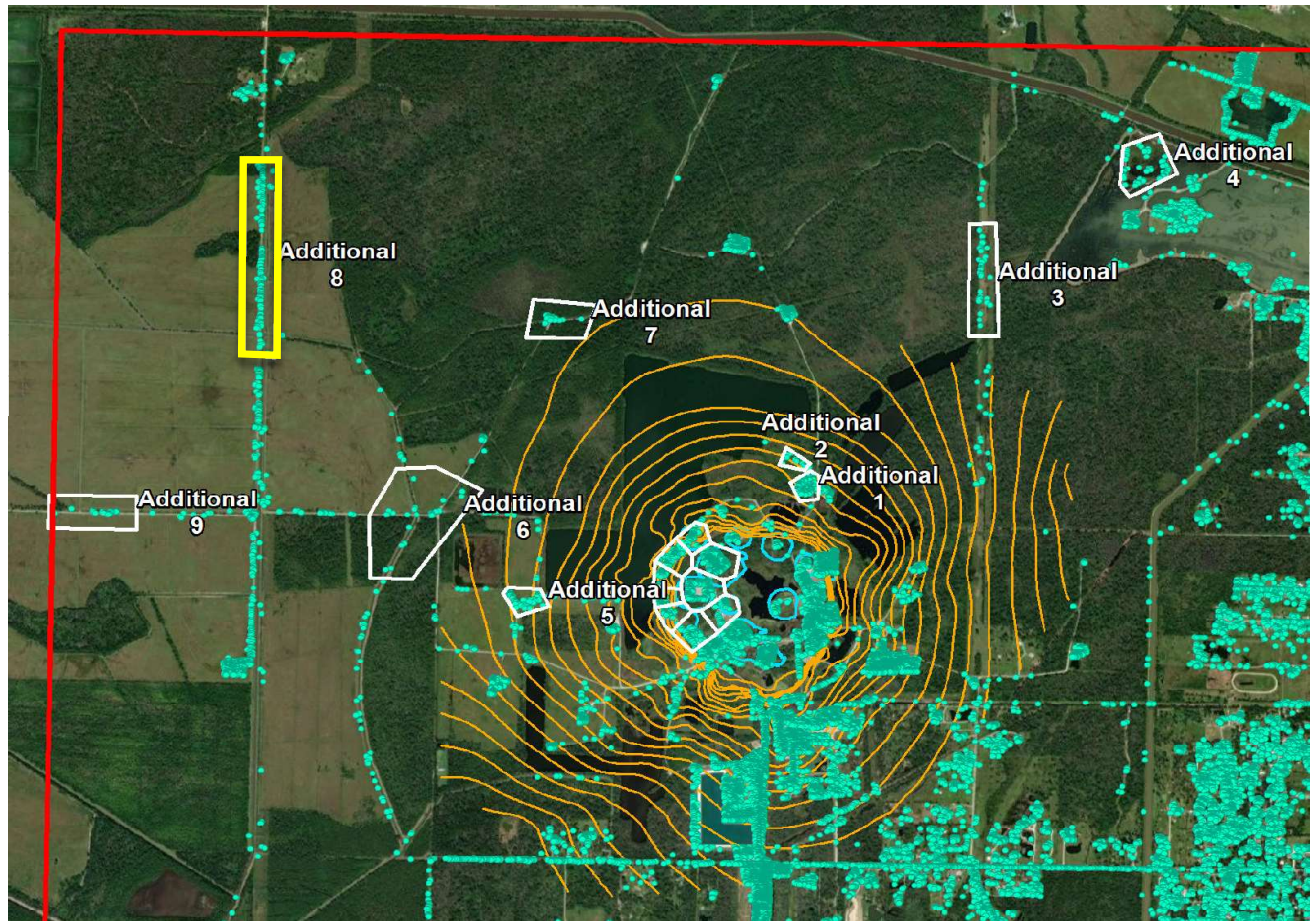
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)

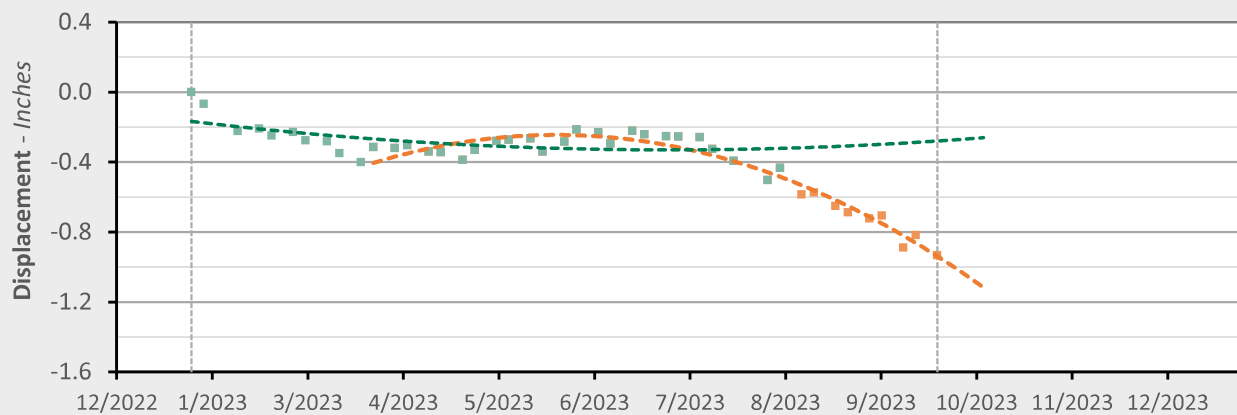


## Additional 8 - Location Map



## Additional 8 - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 203



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	+0.18 in/yr	-4.10 in/yr	-4.28 in/yr
Acceleration:	+1.80 in/yr <sup>2</sup>	-12.12 in/yr <sup>2</sup>	-13.92 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

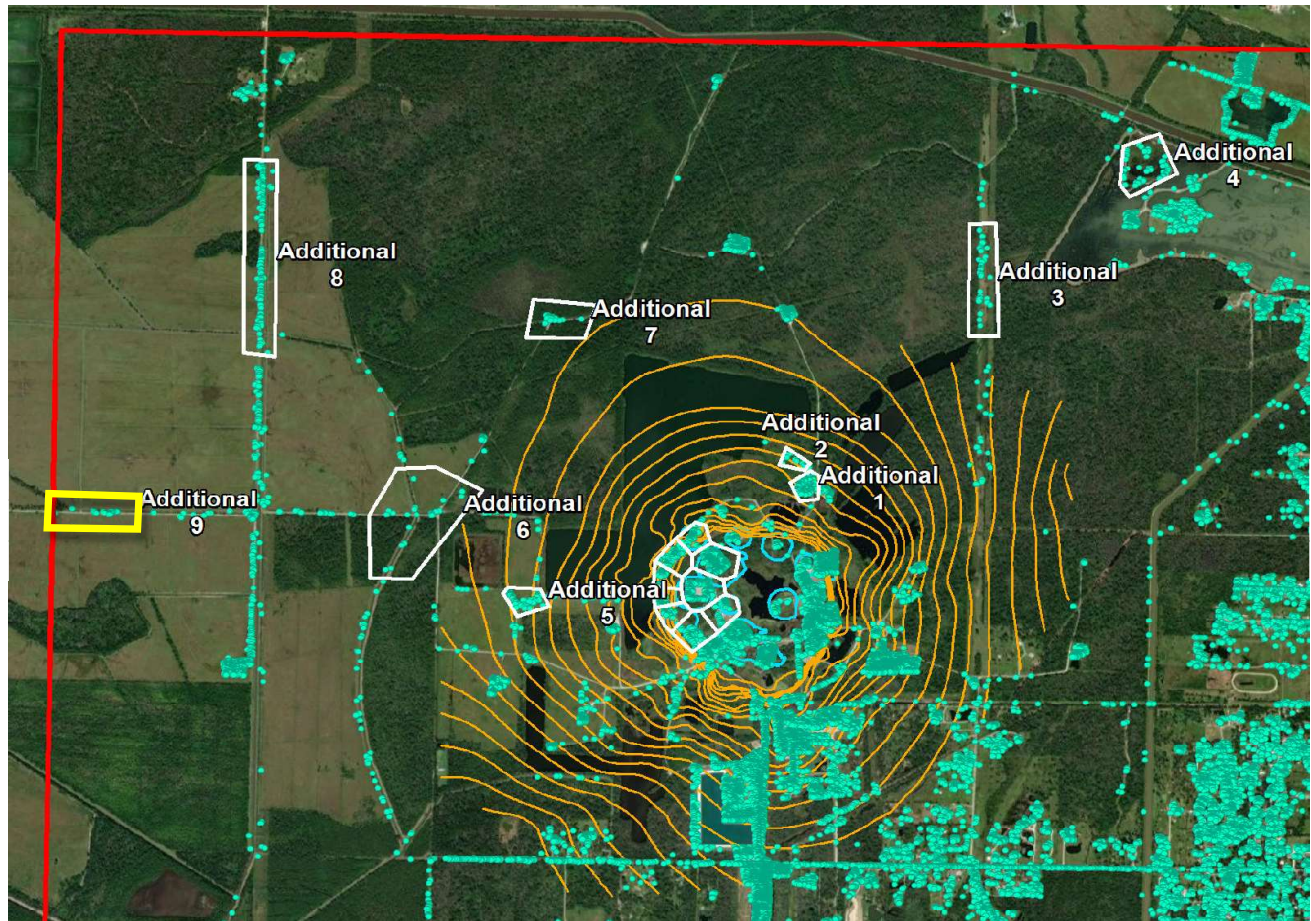
--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)

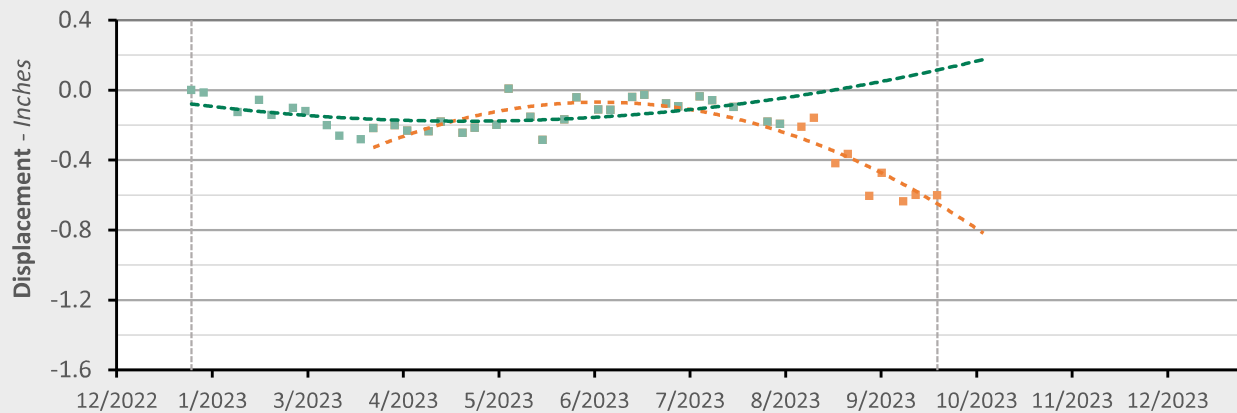


## Additional 9 - Location Map



## Additional 9 - Displacement Time Series

TSX/PAZ (9/23/2023) Point Count: 21



	As of 8/3/23	3/24/2023 - 9/23/23	Trend Change
Velocity:	+0.93 in/yr	-3.86 in/yr	-4.79 in/yr
Acceleration:	+3.32 in/yr <sup>2</sup>	-12.87 in/yr <sup>2</sup>	-16.19 in/yr <sup>2</sup>

■ Historical LOS Displacement Measurement

--- Historical Trend Line (Quadratic Regression)

■ Recent LOS Displacement Measurement

--- Recent Trend Line (Quadratic Regression)