SNT Satellite Update
InSAR Subsidence
September 27, 2023

<u>Lonquist comment:</u>

The PAZ satellite from the TSX/PAZ constellation (4 & 7-day revisit) passed by Sulphur on Wednesday September 27. We received the dataset Friday and noted that the newest datapoint is continuing in the direction of the "recent" trends across all AOI regions. The recent trends are currently being plotted on the data span of 3/24/2023 to present. The "historical" data trends continue to be calculated from a data span of 1/24/2023 - 8/3/2023, before trend departure was observed.

As with the prior update, we have appended a review of the distant "Additional" locations of interest to this report, where we are still seeing similar or greater acceleration increases.

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:
Lonquist & Co., LLC
8591 United Plaza Blvd.
Suite 280
Baton Rouge, LA 70809

Date Signed: October 2, 2023
Austin, Texas

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

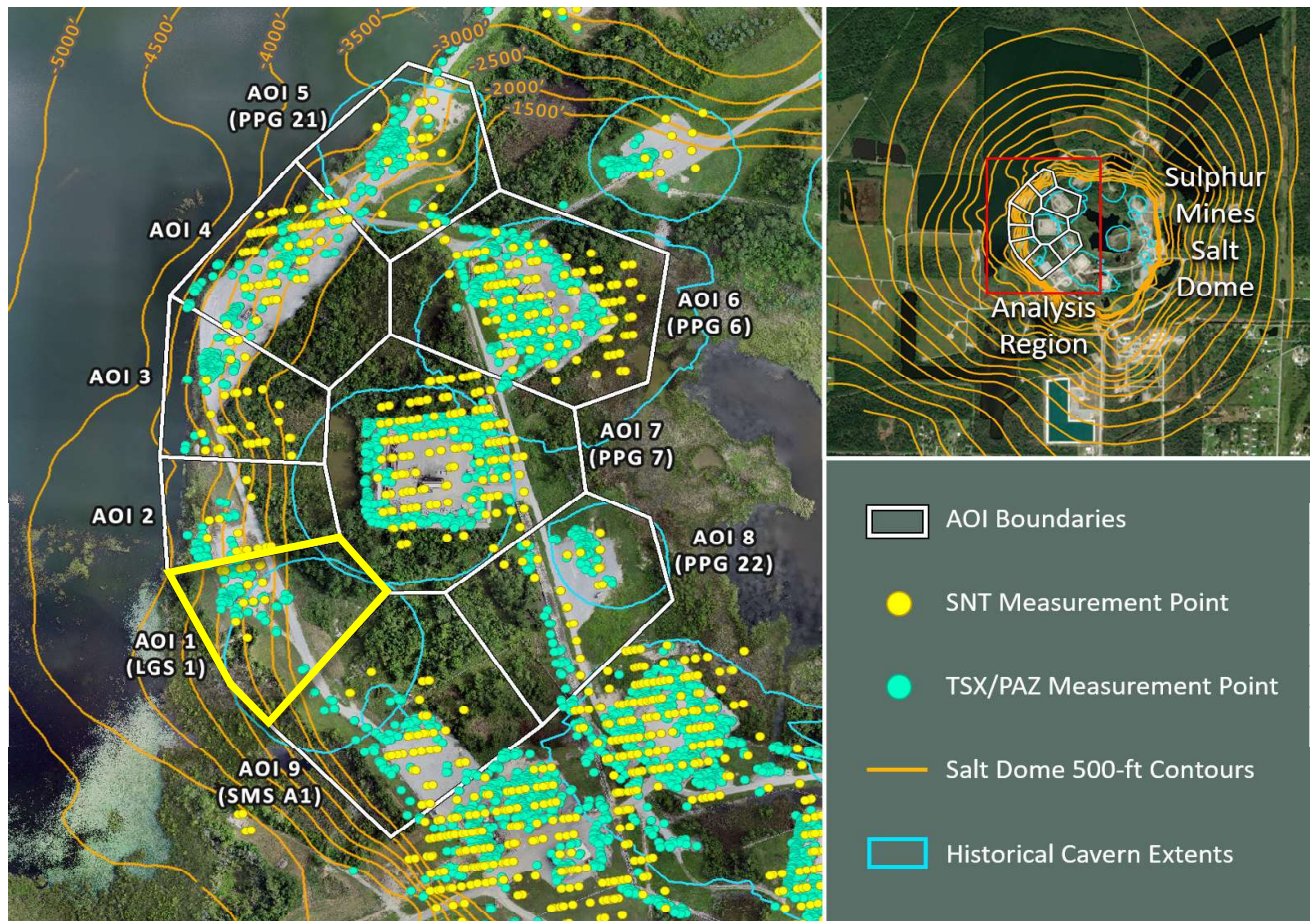| Dataset |
| --- |
| Satellite Source |
| **TerraSAR-X - PAZ Constellation** |
| Most Recent Image Date |
| **Wednesday, September 27, 2023** |

Analysis Report Date:

October 2, 2023

AOI 1 *(LGS 1)* - Location Map

AOI 5
(PPG 21)

AOI 4

AOI 3

AOI 2

AOI 1
(LGS 1)

AOI 9
(SMS A1)

AOI 6
(PPG 6)

AOI 7
(PPG 7)

AOI 8
(PPG 22)

Sulphur
Mines
Salt
Dome

Analysis
Region

Legend:

- ▭ AOI Boundaries
- ● SNT Measurement Point
- ● TSX/PAZ Measurement Point
- ─ Salt Dome 500-ft Contours
- ▭ Historical Cavern Extents

AOI 1 *(LGS 1)* - Displacement Time Series   TSX/PAZ (9/27/2023) Point Count: **77**
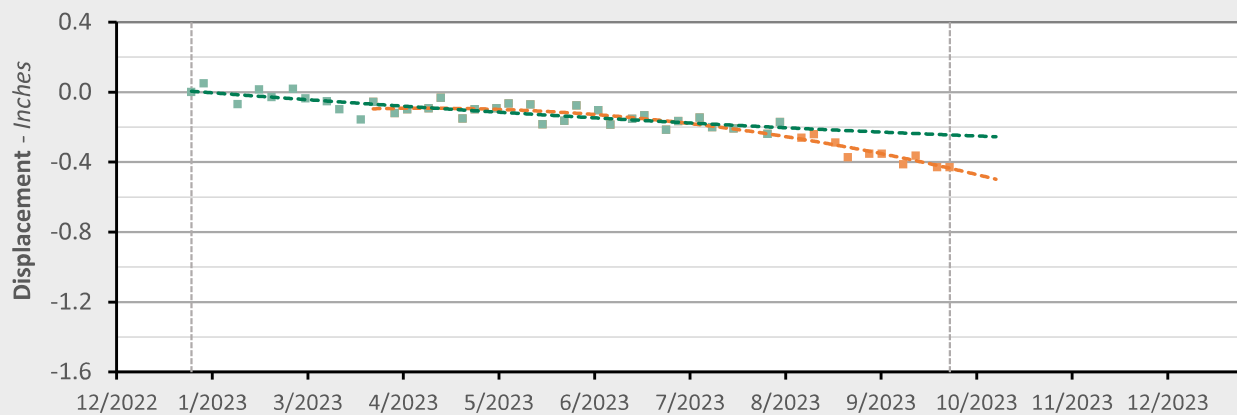
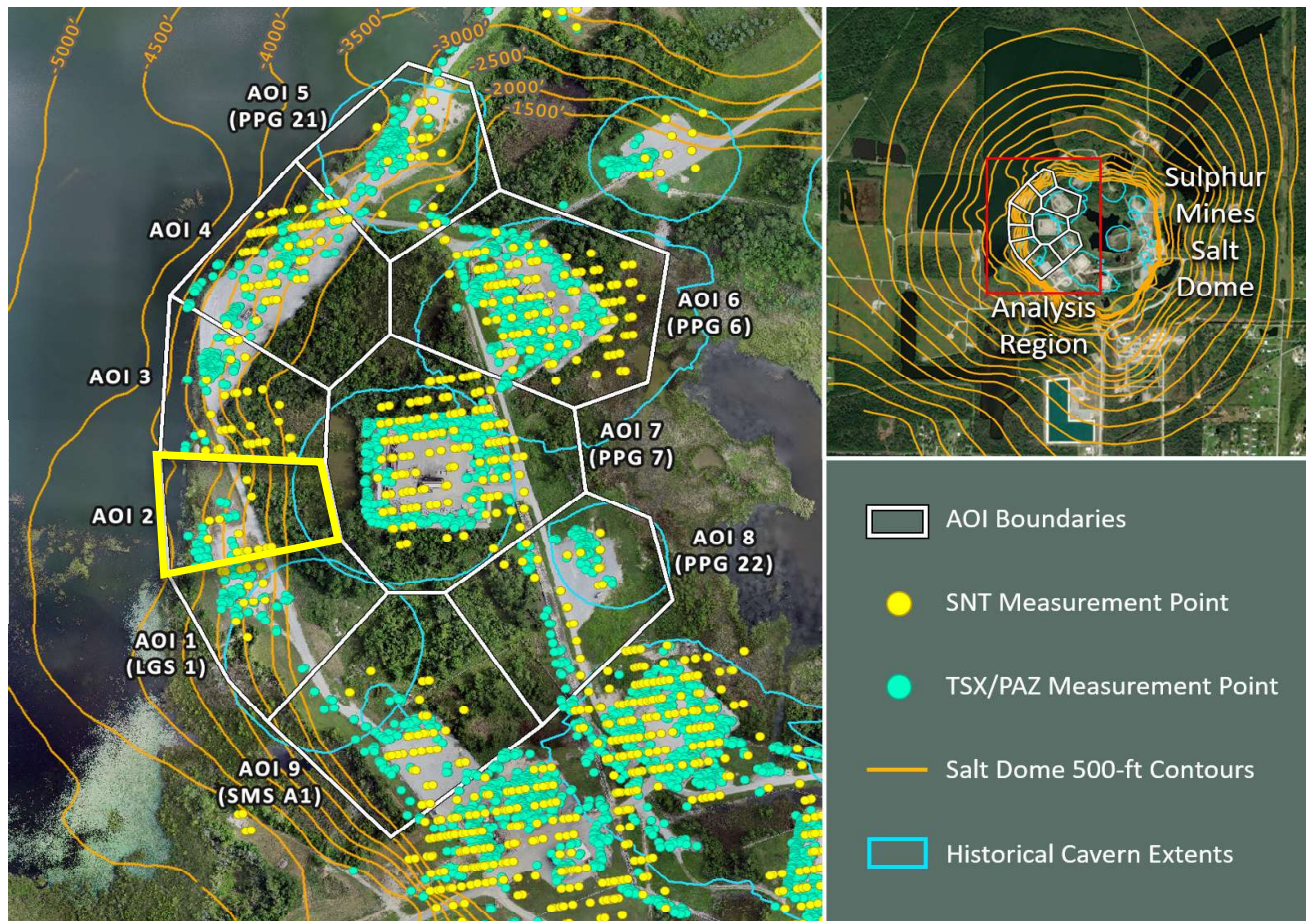|	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	-0.31 in/yr	-1.47 in/yr	-1.16 in/yr
Acceleration:	+0.34 in/yr^2	-3.15 in/yr^2	-3.49 in/yr^2

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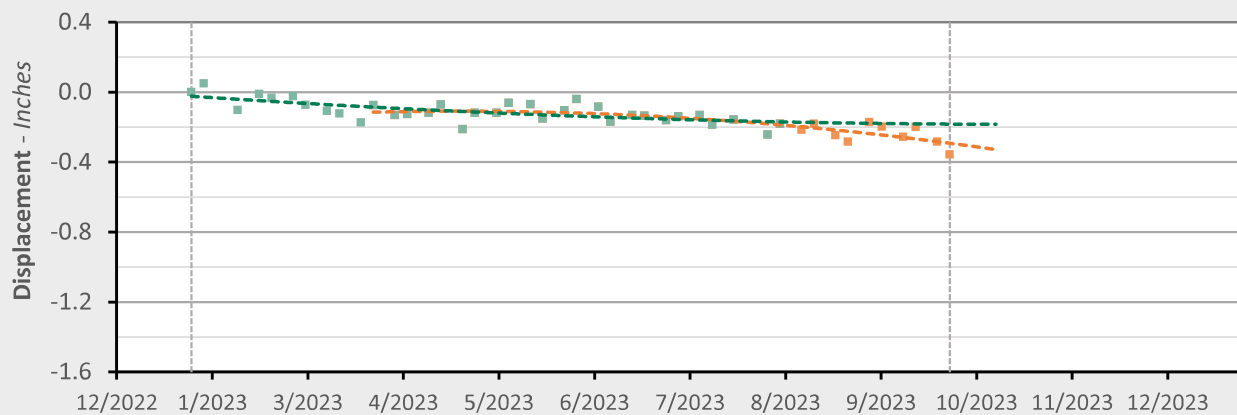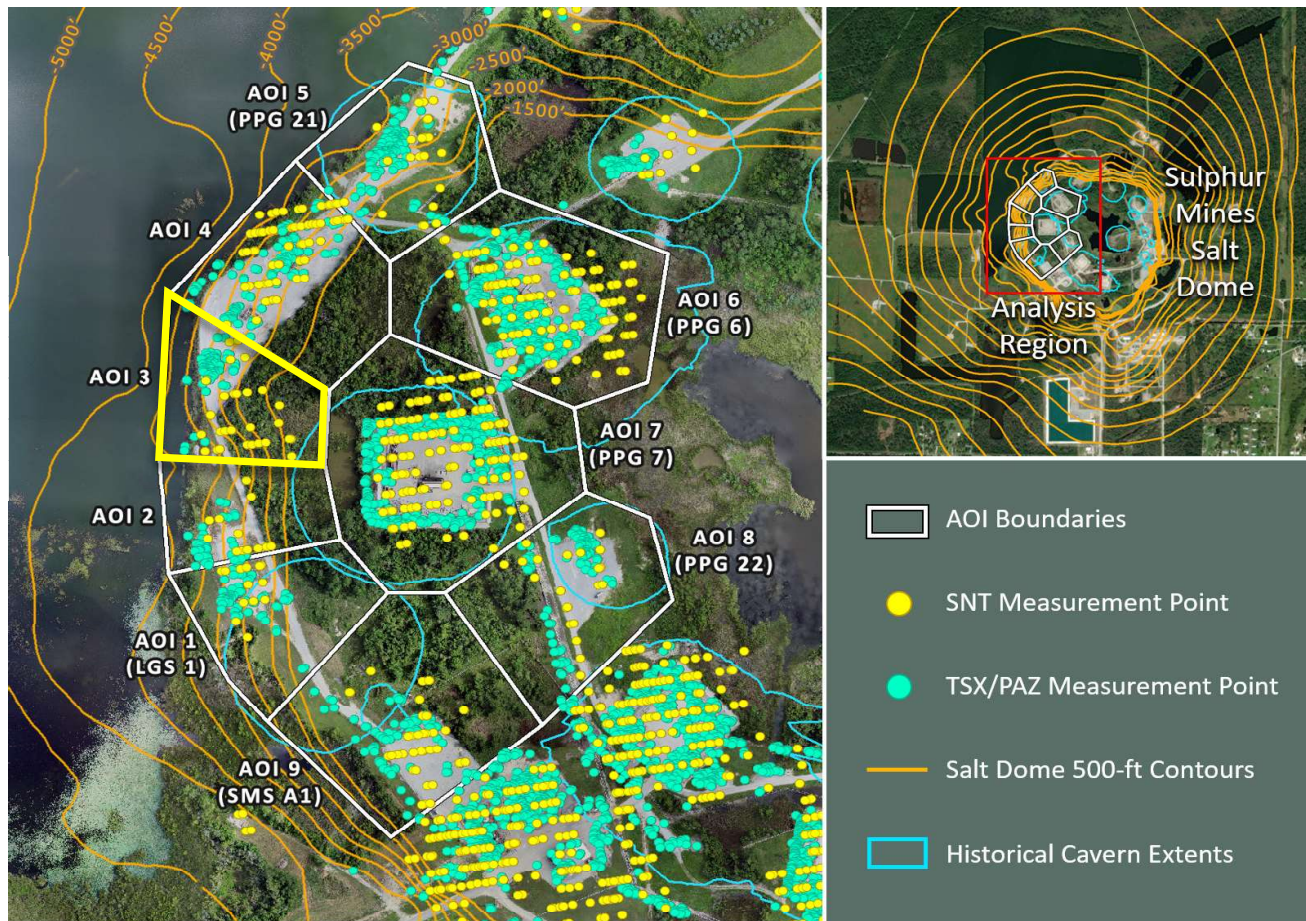- ■ Recent LOS Displacement Measurement
- ┅ Recent Trend Line (Quadratic Regression)

AOI 2 - Location Map

Legend:
- ▭ AOI Boundaries
- 🟡 SNT Measurement Point
- 🟢 TSX/PAZ Measurement Point
- ━ Salt Dome 500-ft Contours
- ▭ Historical Cavern Extents

AOI 2 - Displacement Time Series

TSX/PAZ (9/27/2023) Point Count: **42**

	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	-0.13 in/yr	-0.84 in/yr	-0.71 in/yr
Acceleration:	+0.58 in/yr^2	-1.94 in/yr^2	-2.52 in/yr^2

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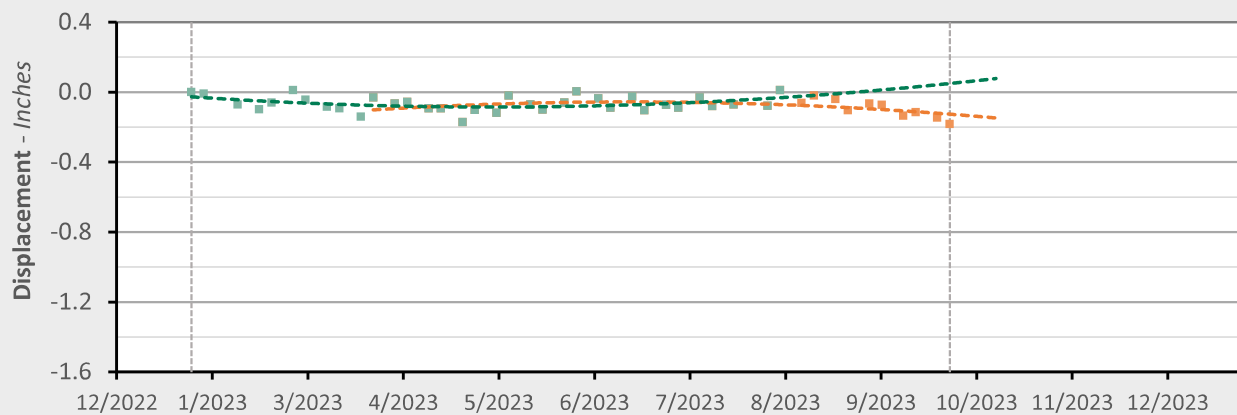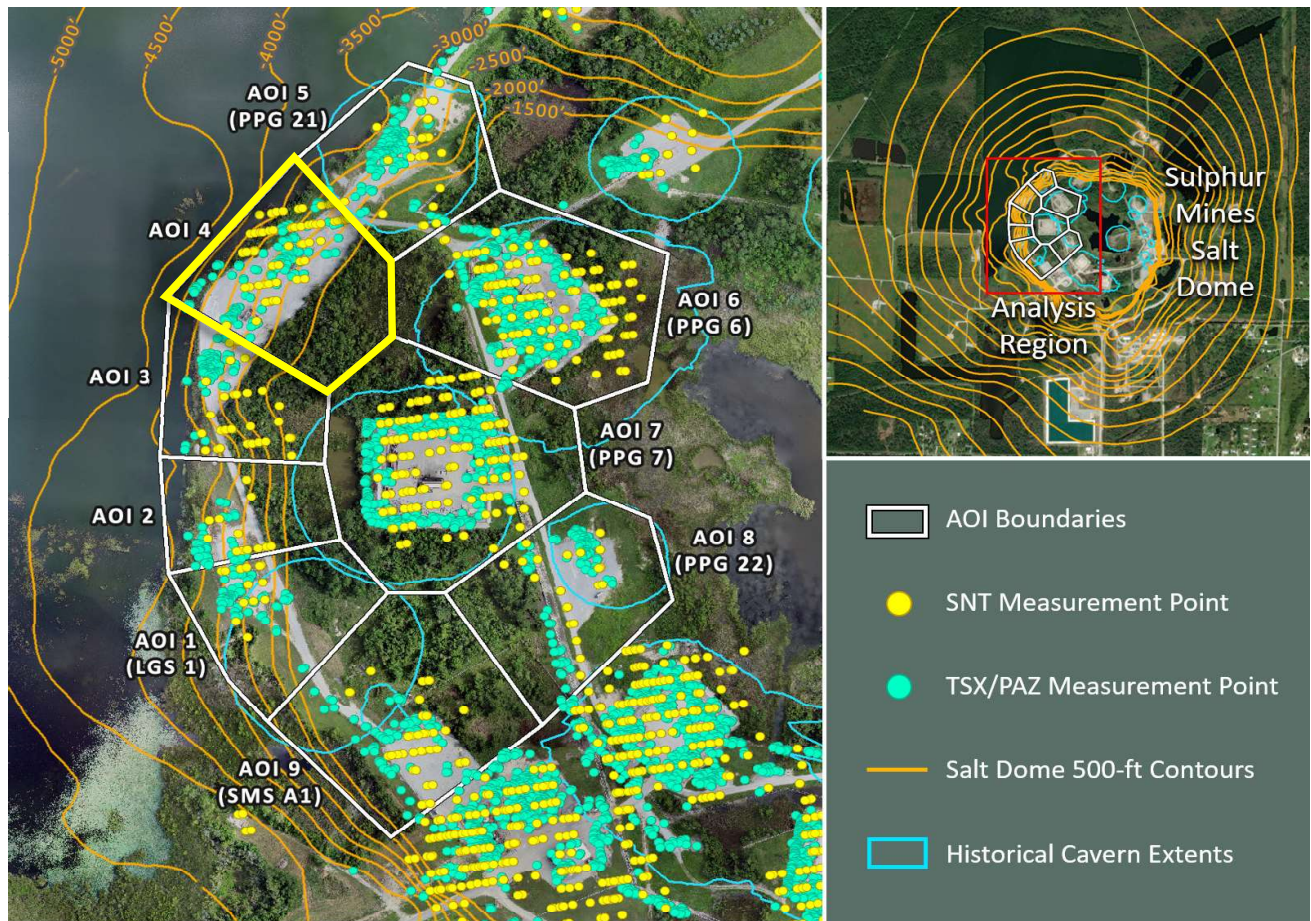- ■ Recent LOS Displacement Measurement
- ┅ Recent Trend Line (Quadratic Regression)

AOI 3 - Location Map

Legend:
- AOI Boundaries
- SNT Measurement Point
- TSX/PAZ Measurement Point
- Salt Dome 500-ft Contours
- Historical Cavern Extents

AOI 5 (PPG 21), AOI 4, AOI 3, AOI 2, AOI 1 (LGS 1), AOI 6 (PPG 6), AOI 7 (PPG 7), AOI 8 (PPG 22), AOI 9 (SMS A1)

Sulphur Mines Salt Dome, Analysis Region

AOI 3 - Displacement Time Series

TSX/PAZ (9/27/2023) Point Count: **81**

	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	+0.42 in/yr	-0.49 in/yr	-0.91 in/yr
Acceleration:	+1.63 in/yr²	-1.74 in/yr²	-3.37 in/yr²

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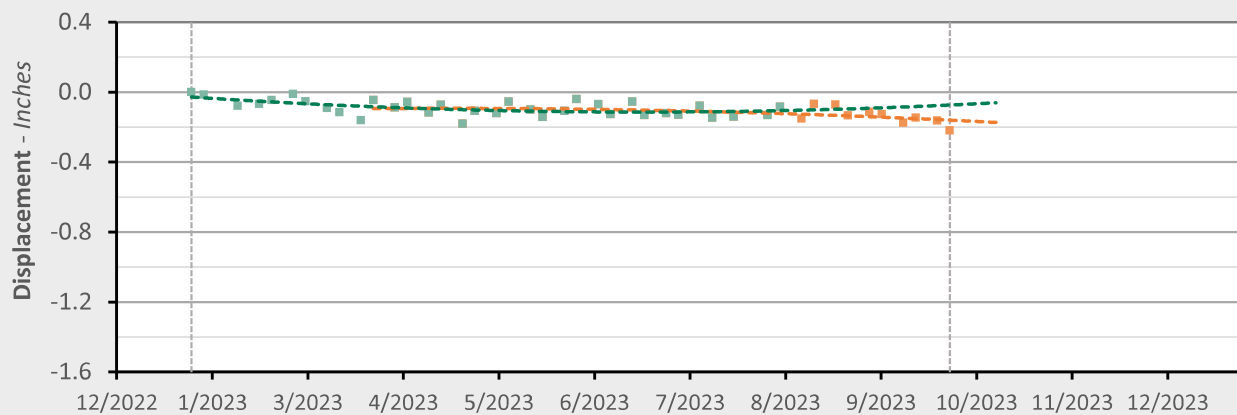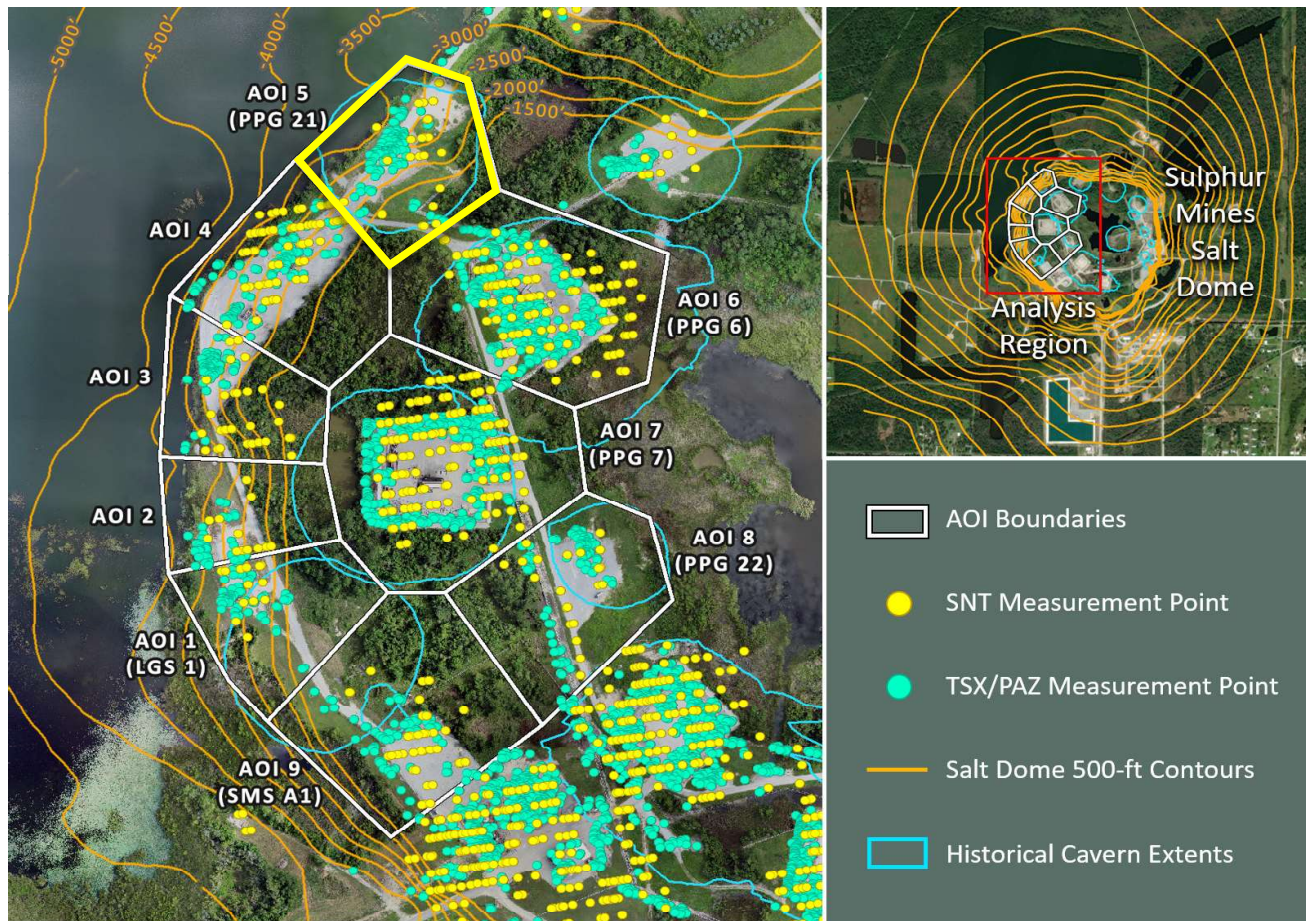- Recent LOS Displacement Measurement
- Recent Trend Line (Quadratic Regression)

AOI 4 - Location Map

Legend:
- AOI Boundaries
- SNT Measurement Point
- TSX/PAZ Measurement Point
- Salt Dome 500-ft Contours
- Historical Cavern Extents

Map labels: AOI 5 (PPG 21), AOI 4, AOI 3, AOI 2, AOI 1 (LGS 1), AOI 9 (SMS A1), AOI 6 (PPG 6), AOI 7 (PPG 7), AOI 8 (PPG 22), Sulphur Mines Salt Dome, Analysis Region

AOI 4 - Displacement Time Series

TSX/PAZ (9/27/2023) Point Count: **140**

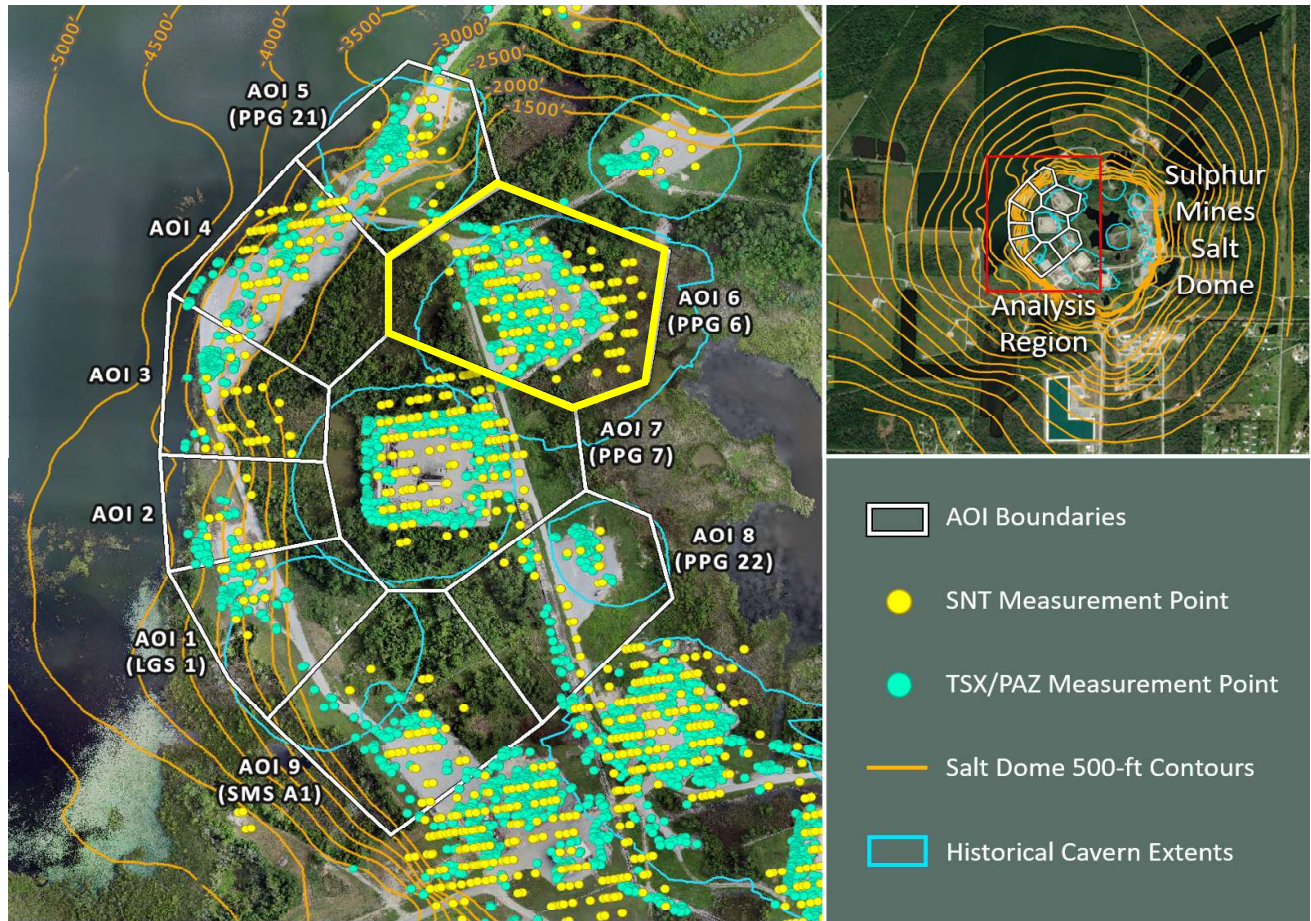|	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	+0.13 in/yr	-0.30 in/yr	-0.44 in/yr
Acceleration:	+1.07 in/yr^2	-0.68 in/yr^2	-1.76 in/yr^2

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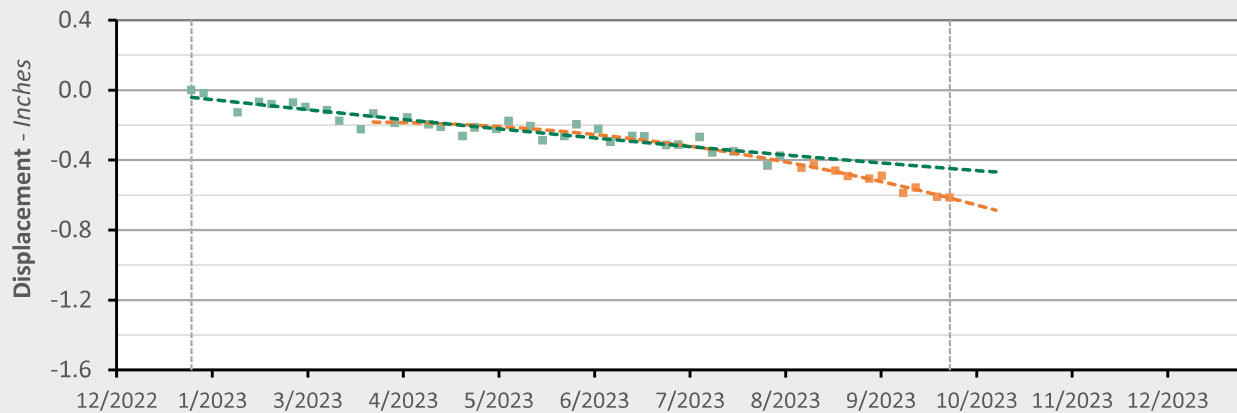- Recent Trend Line (Quadratic Regression)

AOI 5 *(PPG 21)* - Location Map

Legend:
- ▭ AOI Boundaries
- 🟡 SNT Measurement Point
- 🟢 TSX/PAZ Measurement Point
- ━ Salt Dome 500-ft Contours
- ▭ Historical Cavern Extents

AOI 5 *(PPG 21)* - Displacement Time Series TSX/PAZ (9/27/2023) Point Count: **136**
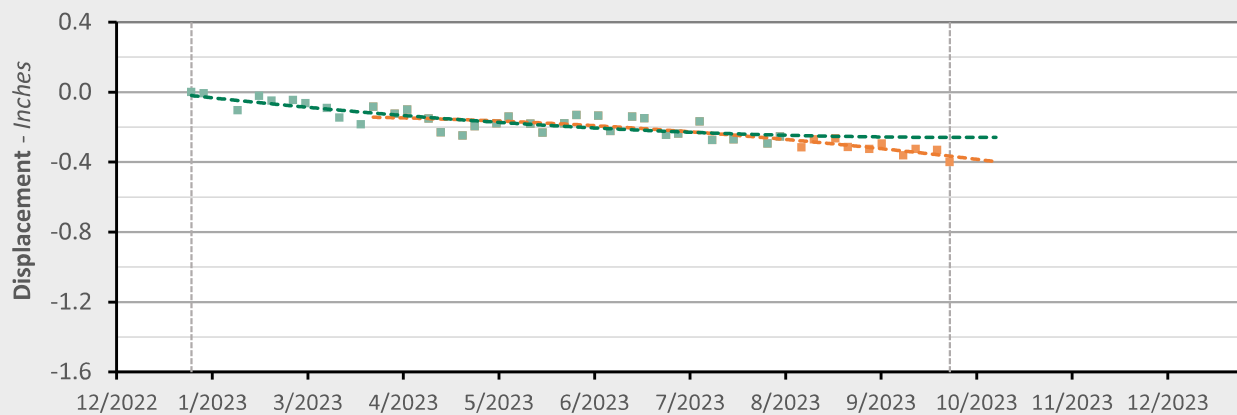
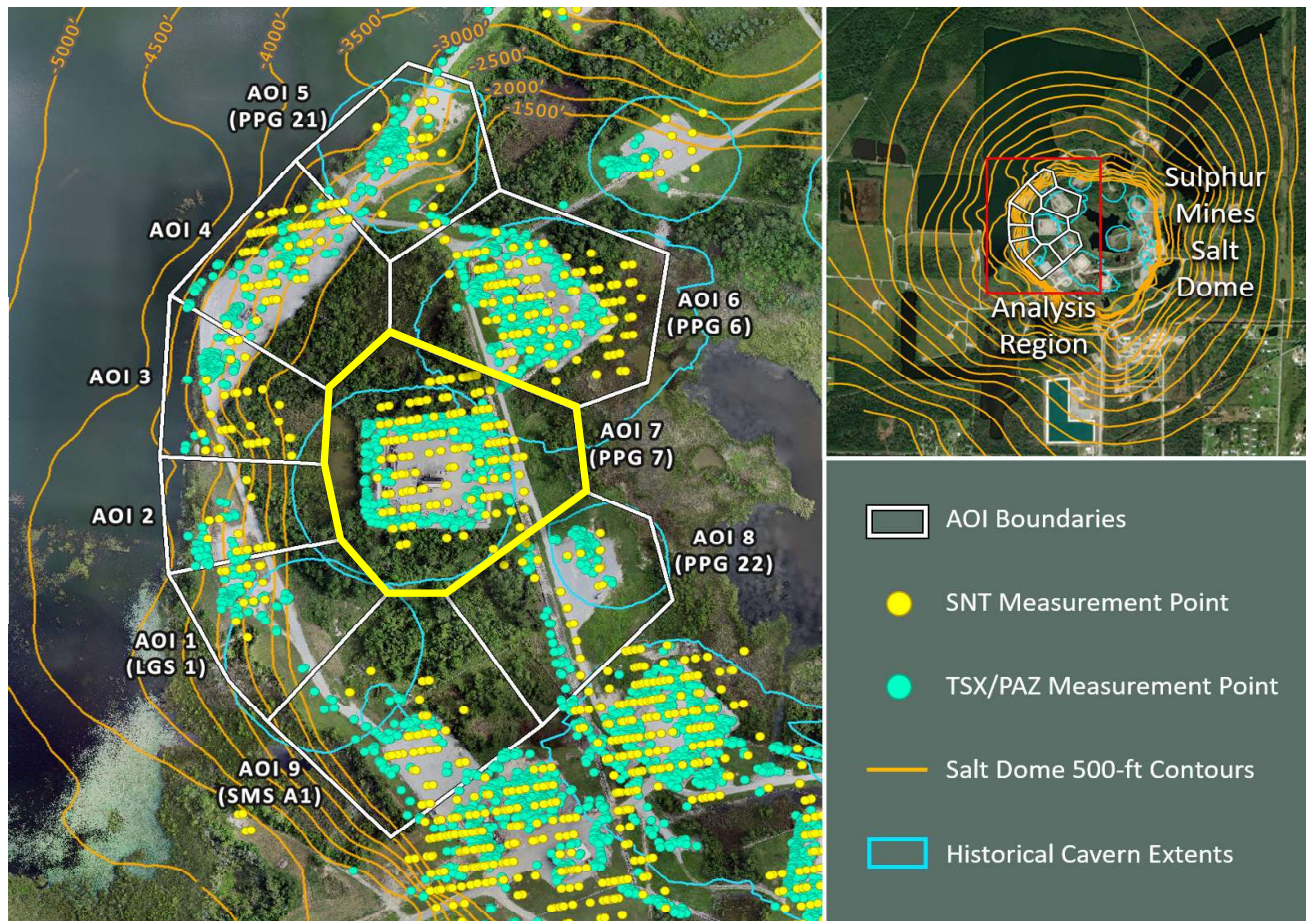|	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	-0.16 in/yr	-0.74 in/yr	-0.58 in/yr
Acceleration:	+1.03 in/yr^2	-1.20 in/yr^2	-2.23 in/yr^2

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

AOI 6 *(PPG 6)* - Location Map

Legend:
- AOI Boundaries
- ● SNT Measurement Point
- ● TSX/PAZ Measurement Point
- Salt Dome 500-ft Contours
- Historical Cavern Extents

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

TSX/PAZ (9/27/2023) Point Count: **428**

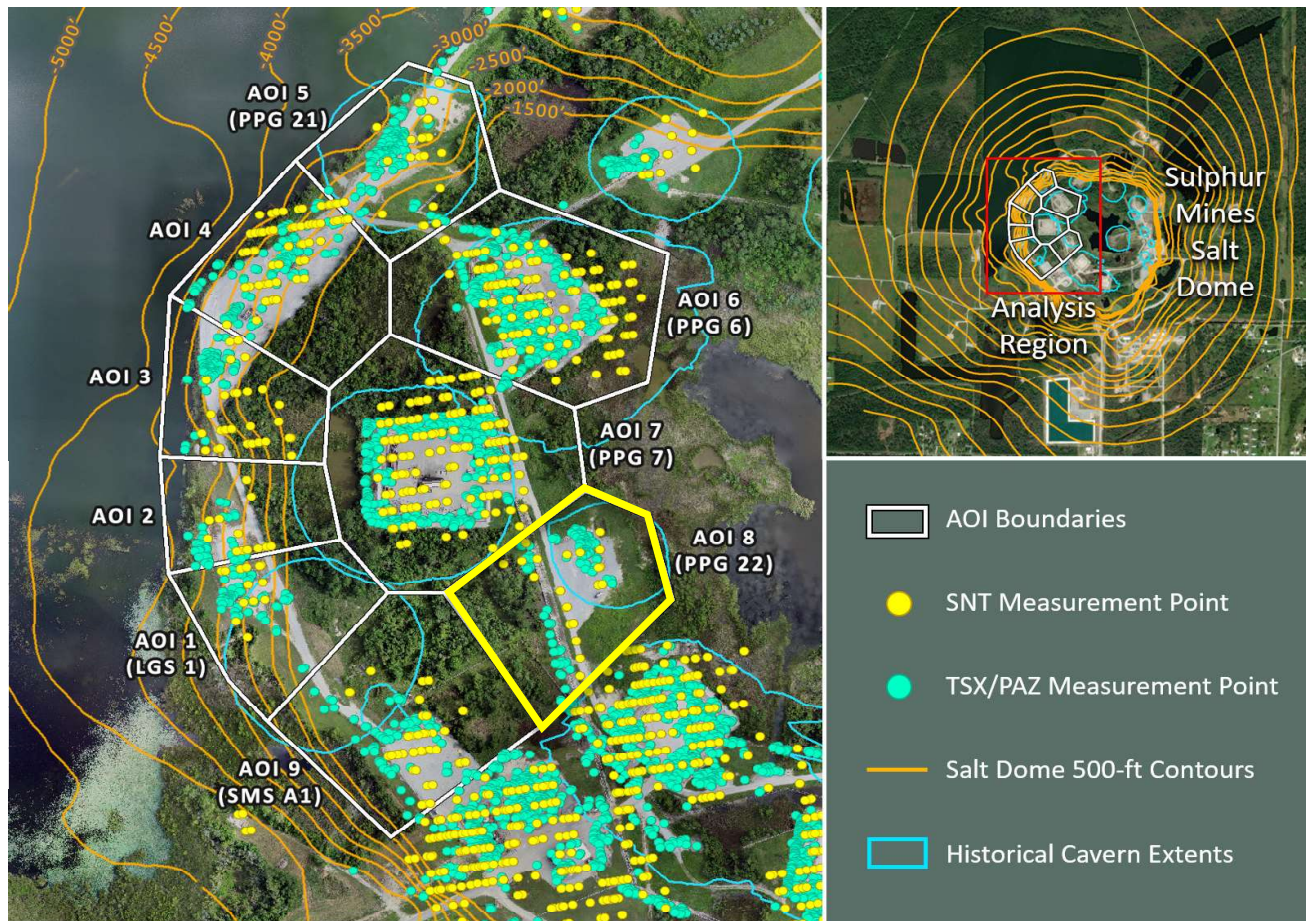|	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	-0.55 in/yr	-1.64 in/yr	-1.09 in/yr
Acceleration:	+0.28 in/yr²	-3.09 in/yr²	-3.37 in/yr²

Legend:
- ■ Historical LOS Displacement Measurement
- - - Historical Trend Line (Quadratic Regression)
- ■ Recent LOS Displacement Measurement
- - - Recent Trend Line (Quadratic Regression)
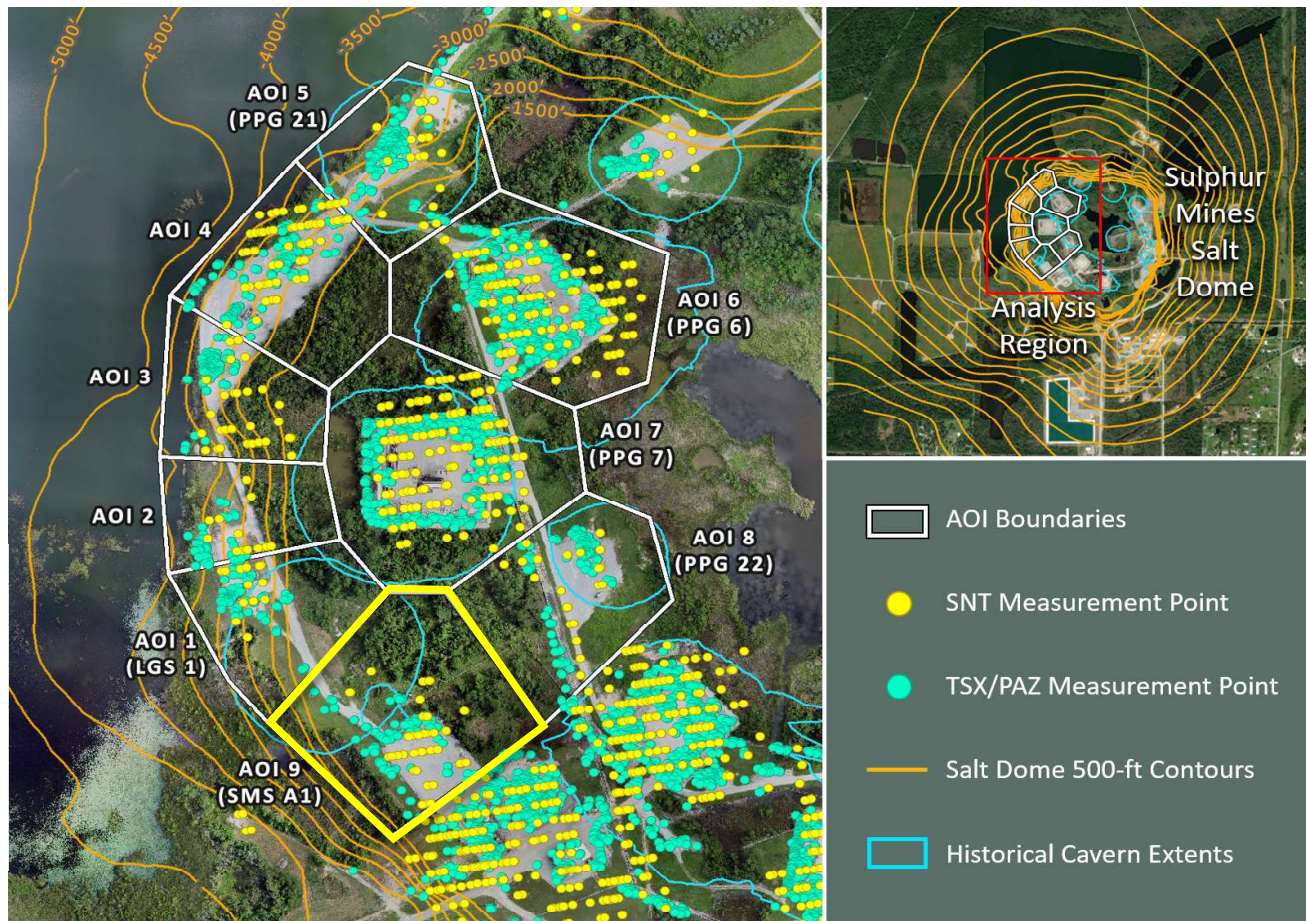
AOI 7 *(PPG 7)* - Location Map

Legend:
- AOI Boundaries
- SNT Measurement Point
- TSX/PAZ Measurement Point
- Salt Dome 500-ft Contours
- Historical Cavern Extents

Map labels: AOI 5 (PPG 21), AOI 4, AOI 3, AOI 2, AOI 1 (LGS 1), AOI 9 (SMS A1), AOI 6 (PPG 6), AOI 7 (PPG 7), AOI 8 (PPG 22), Sulphur Mines Salt Dome, Analysis Region

AOI 7 *(PPG 7)* - Displacement Time Series TSX/PAZ (9/27/2023) Point Count: **374**
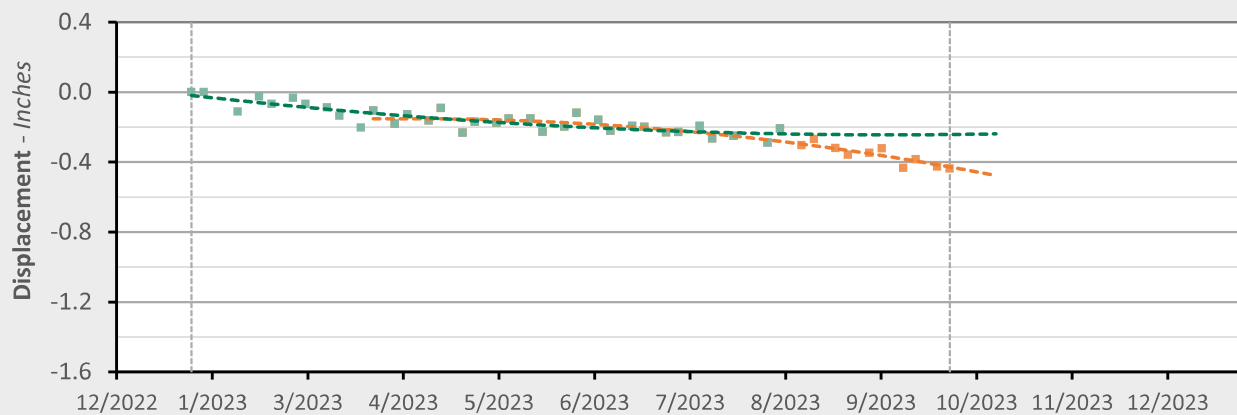
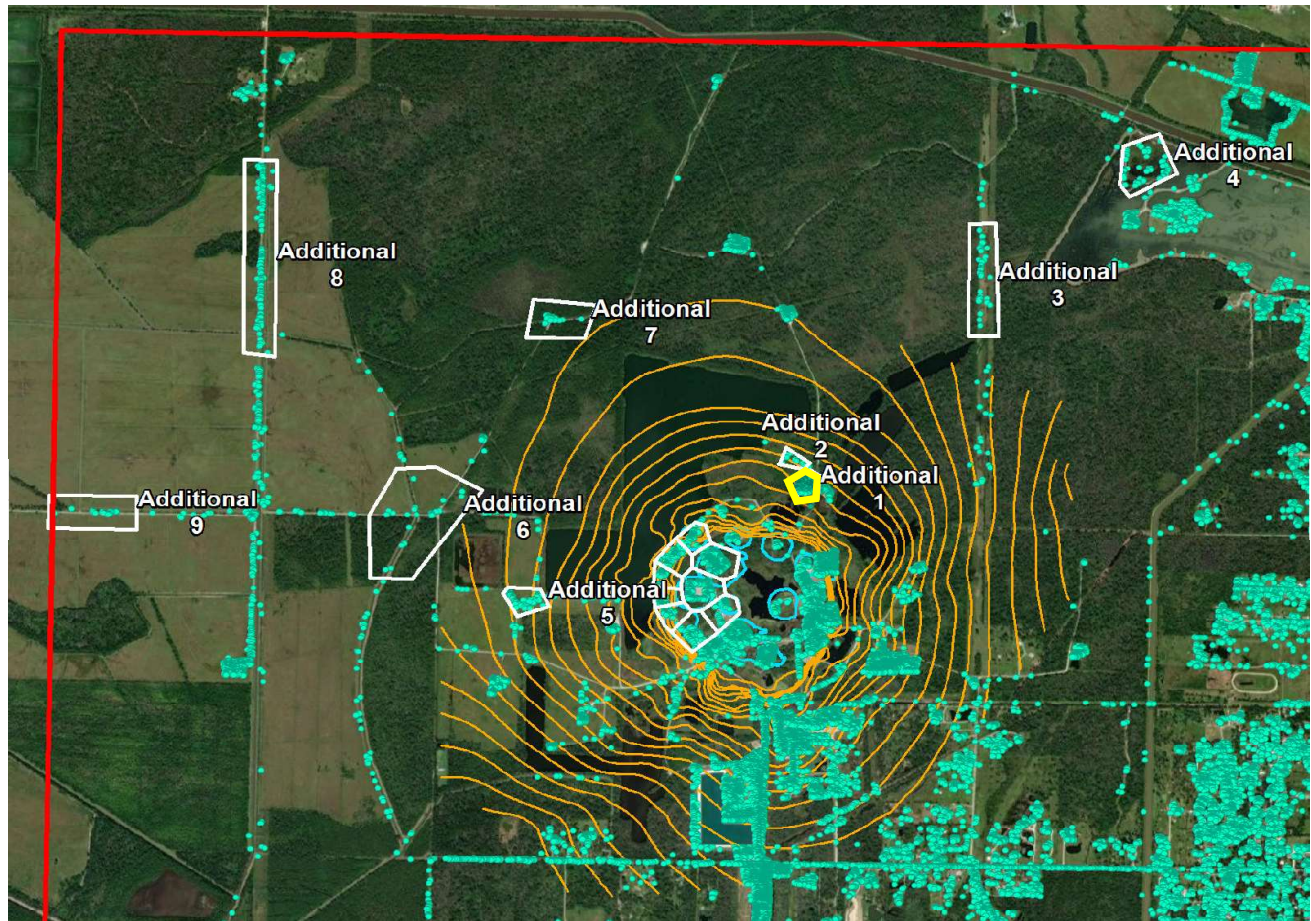|	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	-0.11 in/yr	-1.15 in/yr	-1.04 in/yr
Acceleration:	+1.17 in/yr^2	-2.40 in/yr^2	-3.57 in/yr^2

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

AOI 8 *(PPG 22)* - Location Map

Legend:
- AOI Boundaries
- SNT Measurement Point (yellow)
- TSX/PAZ Measurement Point (teal)
- Salt Dome 500-ft Contours
- Historical Cavern Extents

Map labels: AOI 5 (PPG 21), AOI 4, AOI 3, AOI 2, AOI 1 (LGS 1), AOI 9 (SMS A1), AOI 6 (PPG 6), AOI 7 (PPG 7), AOI 8 (PPG 22), Sulphur Mines Salt Dome, Analysis Region

AOI 8 *(PPG 22)* - Displacement Time Series   TSX/PAZ (9/27/2023) Point Count: **111**
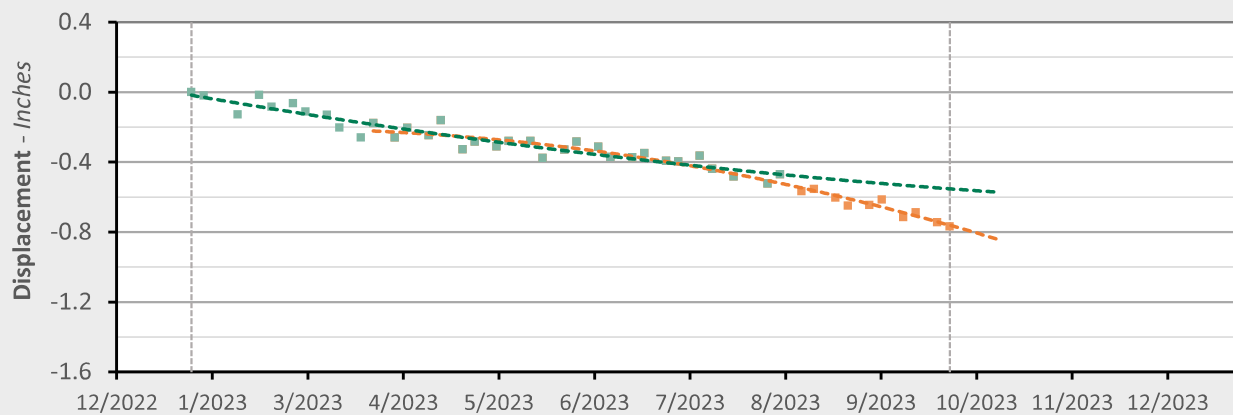
	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	-0.62 in/yr	-1.82 in/yr	-1.20 in/yr
Acceleration:	+0.94 in/yr^2	-3.01 in/yr^2	-3.95 in/yr^2

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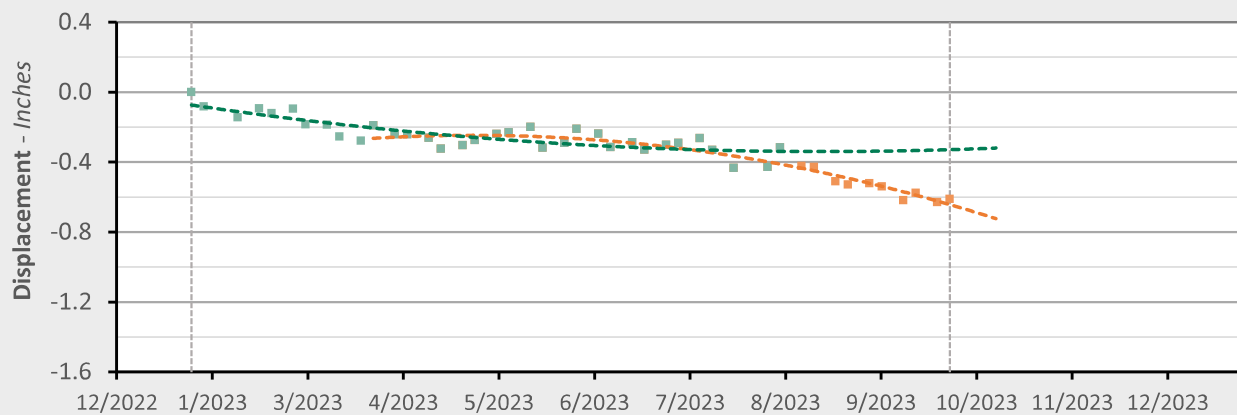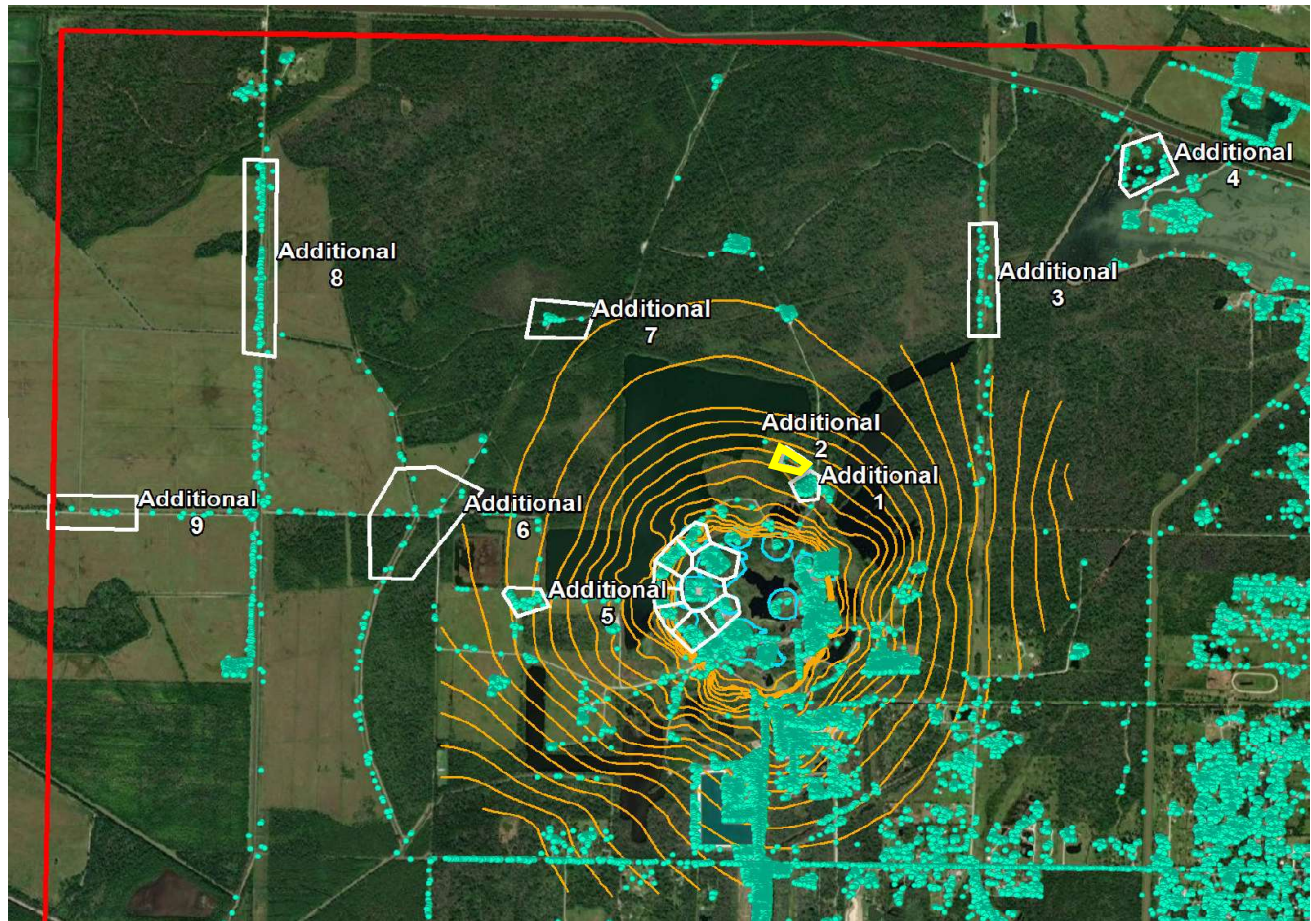- Recent LOS Displacement Measurement
- Recent Trend Line (Quadratic Regression)

AOI 9 *(PPG A1)* - Location Map

- **AOI Boundaries**
- **SNT Measurement Point**
- **TSX/PAZ Measurement Point**
- **Salt Dome 500-ft Contours**
- **Historical Cavern Extents**

AOI 9 *(SMS A1)* - Displacement Time Series TSX/PAZ (9/27/2023) Point Count: **85**
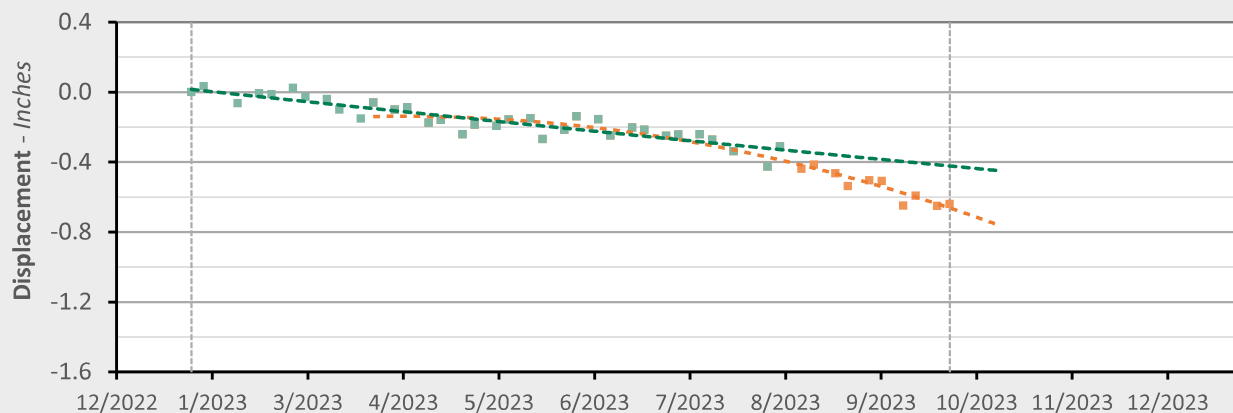
	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	-0.63 in/yr	-2.15 in/yr	-1.53 in/yr
Acceleration:	+0.11 in/yr^2	-4.43 in/yr^2	-4.54 in/yr^2

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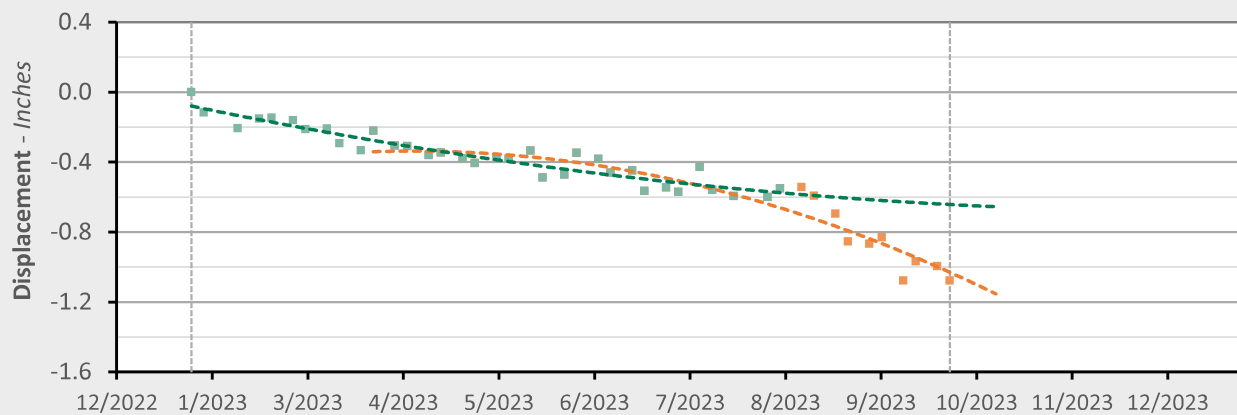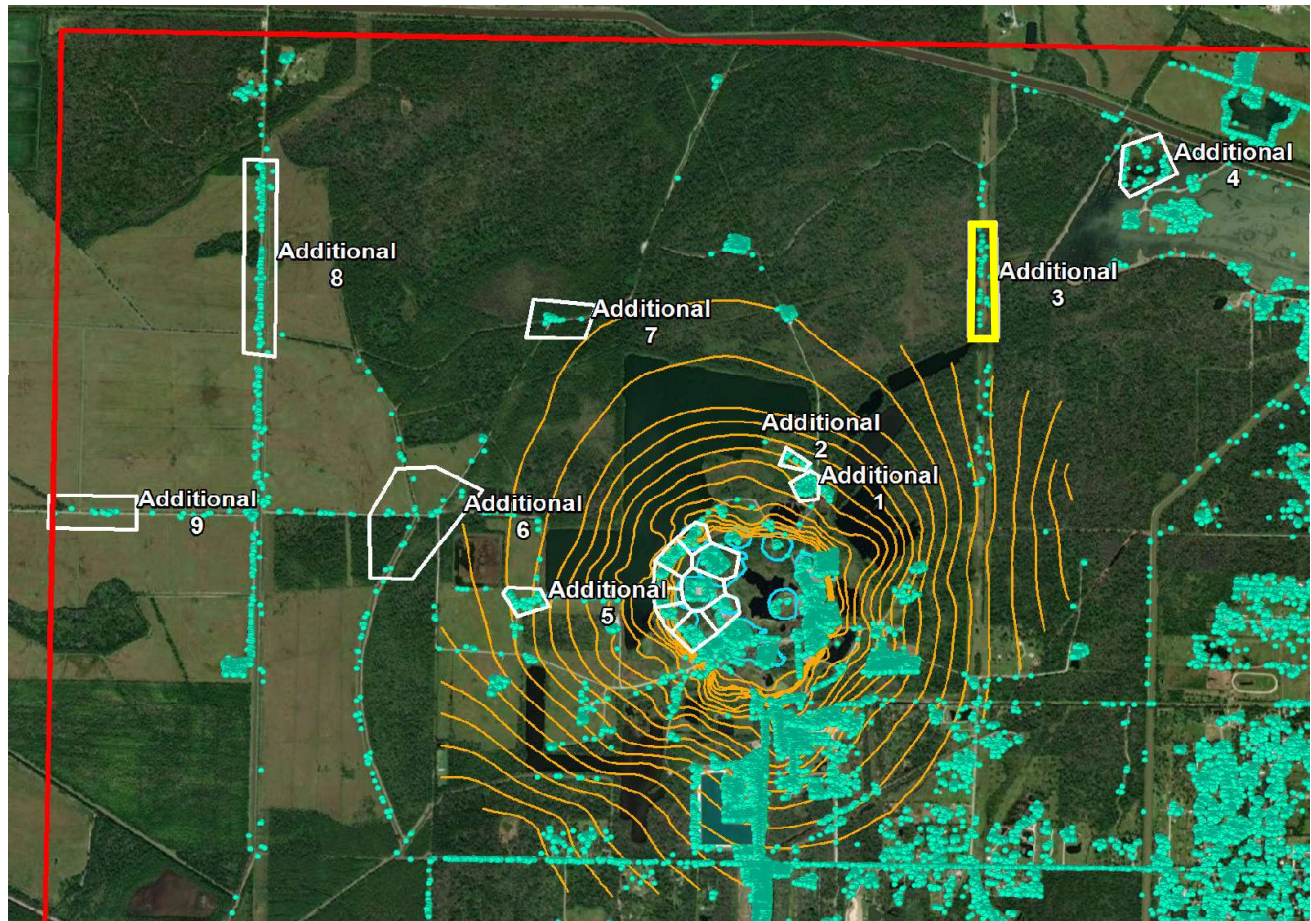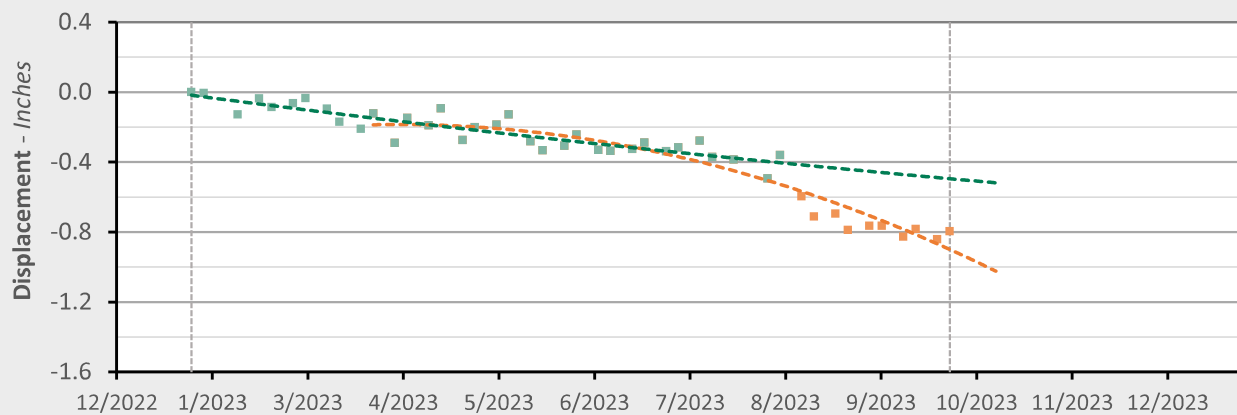- Recent LOS Displacement Measurement
- Recent Trend Line (Quadratic Regression)

Additional 1 - Location Map

Additional 1 - Displacement Time Series   TSX/PAZ (9/27/2023) Point Count: **135**

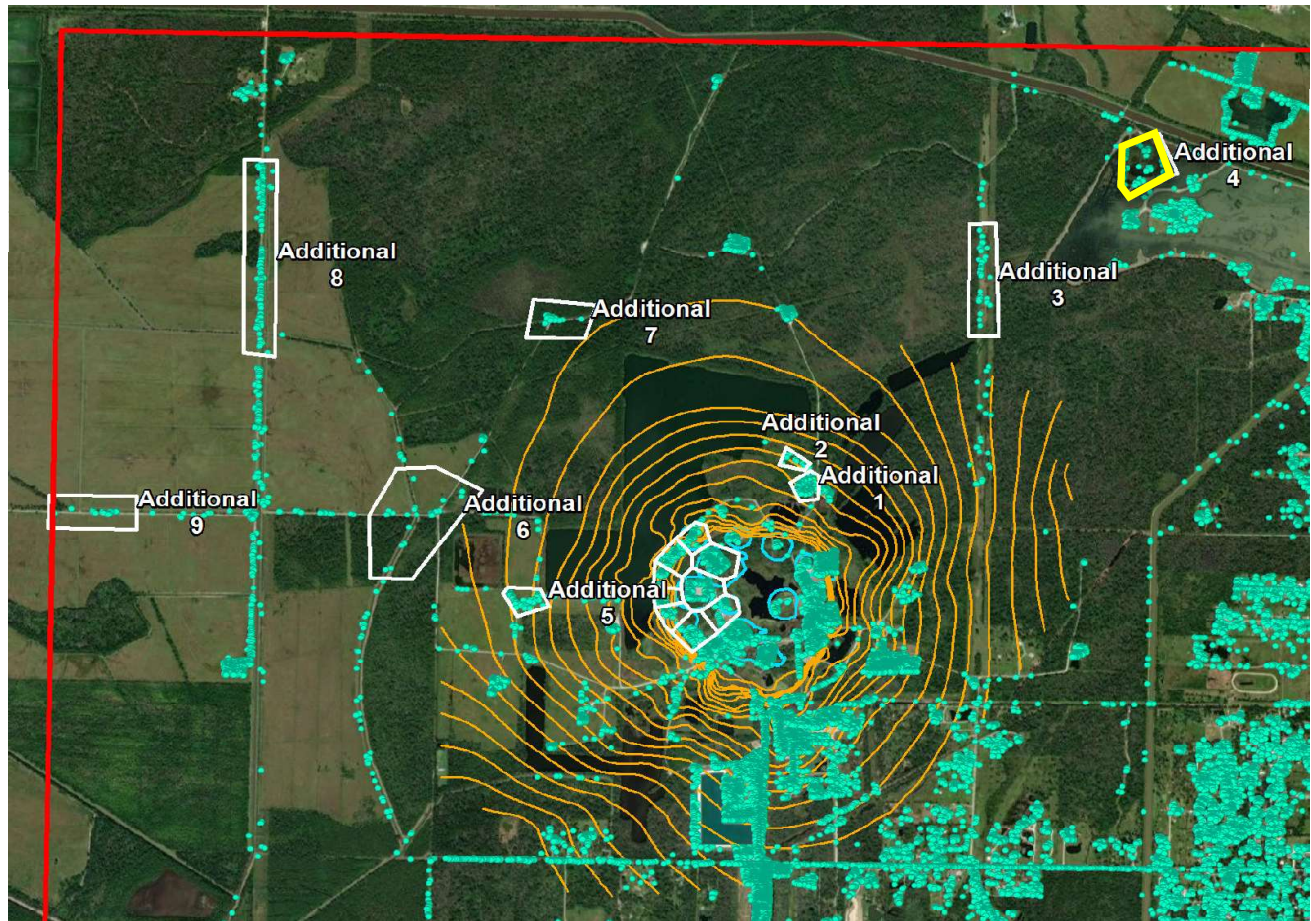|	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	-0.06 in/yr	-1.87 in/yr	-1.81 in/yr
Acceleration:	+1.69 in/yr²	-4.42 in/yr²	-6.11 in/yr²

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

LONQUIST & CO. LLC

Additional 2 - Location Map

Additional 2 - Displacement Time Series   TSX/PAZ (9/27/2023) Point Count: 18

	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	-0.56 in/yr	-2.90 in/yr	-2.34 in/yr
Acceleration:	+1.48 in/yr²	-6.08 in/yr²	-7.56 in/yr²

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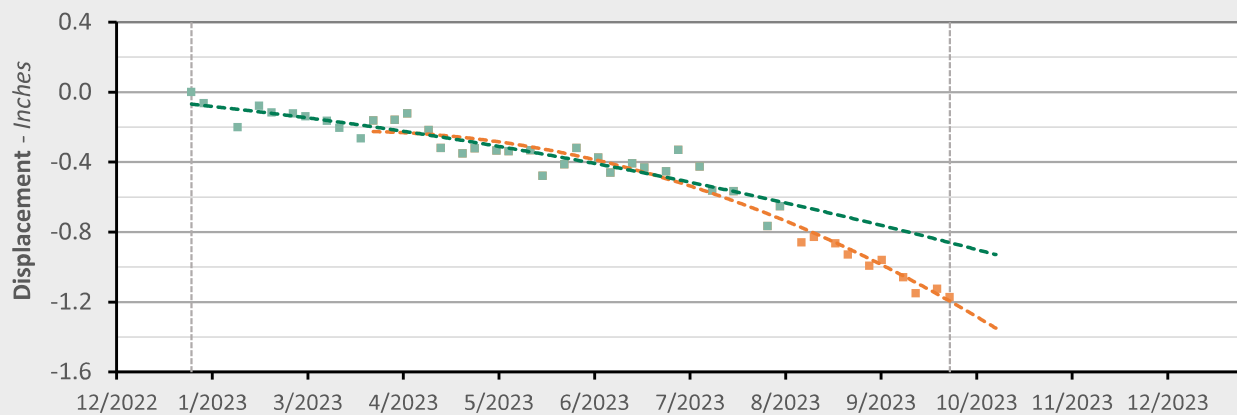- Recent Trend Line (Quadratic Regression)

Additional 3 - Location Map

Additional 3 - Displacement Time Series   TSX/PAZ (9/27/2023) Point Count: **40**

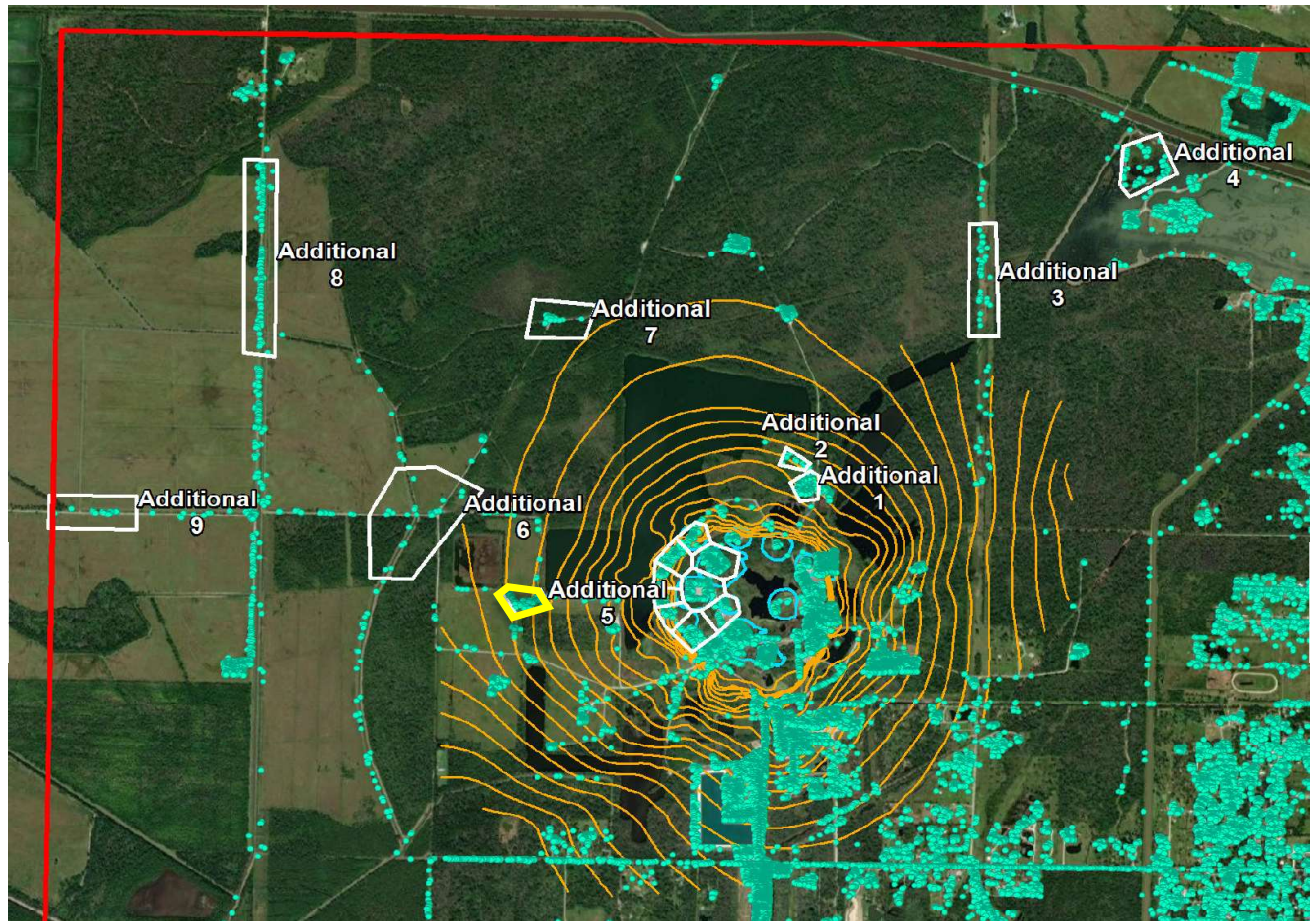|	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	-0.63 in/yr	-2.92 in/yr	-2.28 in/yr
Acceleration:	+0.39 in/yr²	-5.95 in/yr²	-6.35 in/yr²

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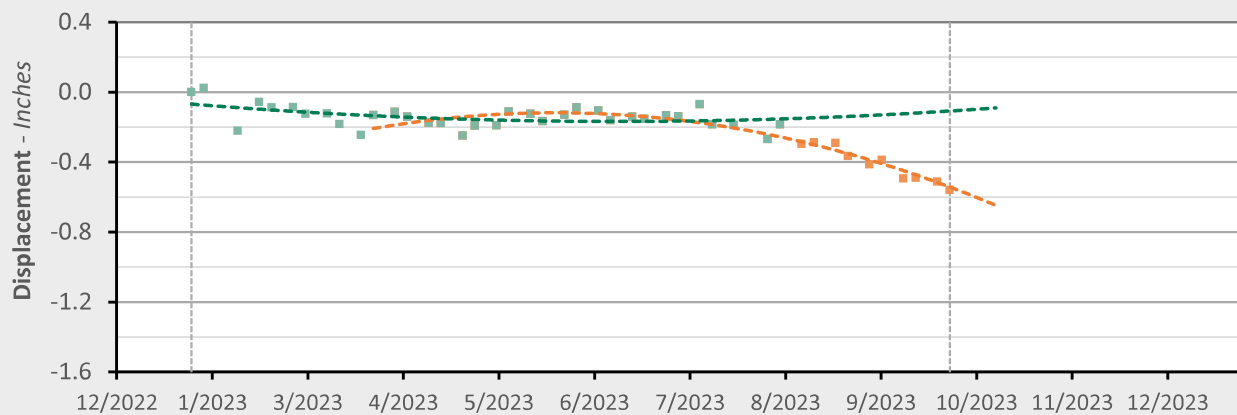- Recent LOS Displacement Measurement
- Recent Trend Line (Quadratic Regression)

Additional 4 - Location Map

Additional 4 - Displacement Time Series   TSX/PAZ (9/27/2023) Point Count: **71**

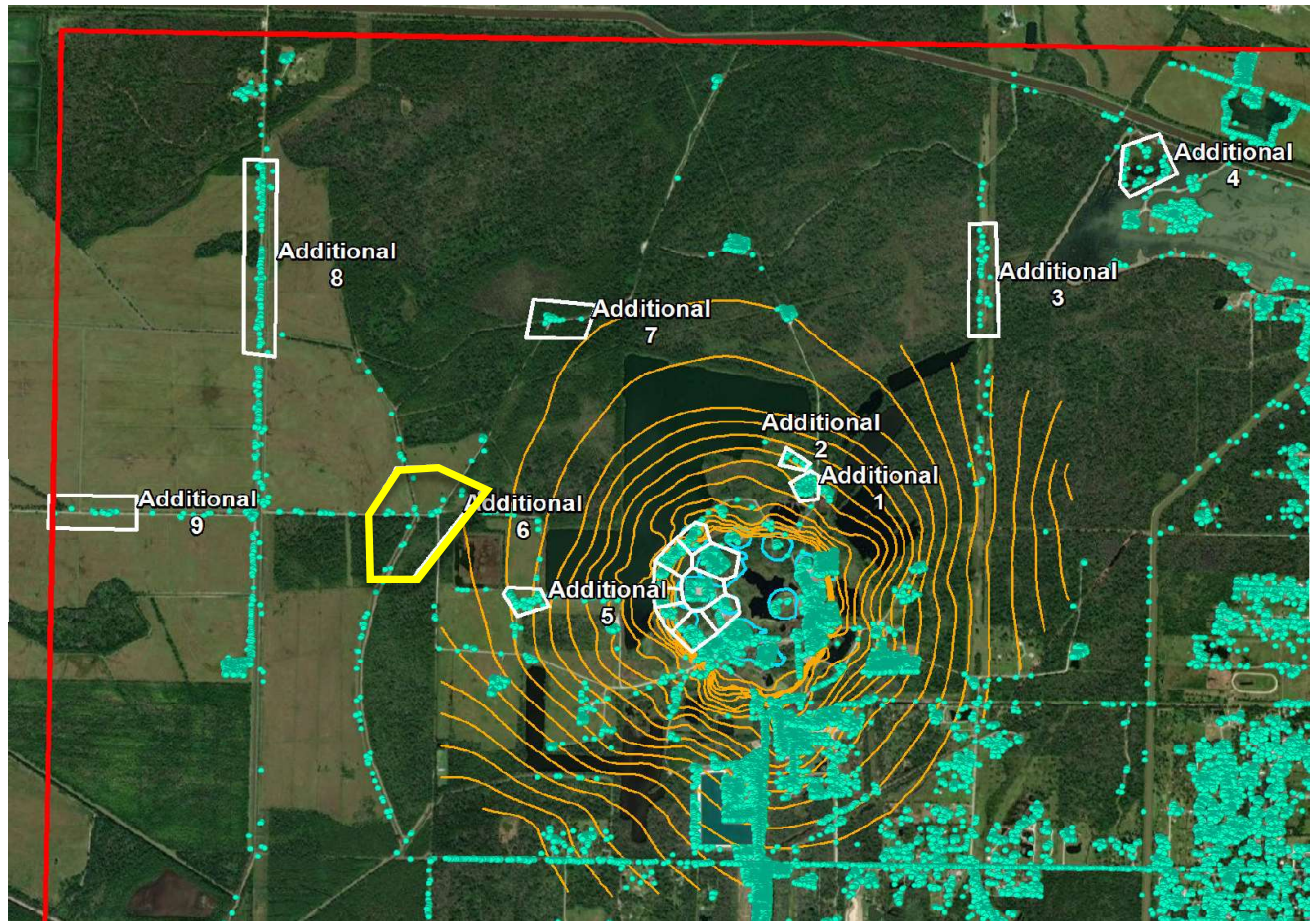|	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	-1.44 in/yr	-3.64 in/yr	-2.20 in/yr
Acceleration:	-1.45 in/yr²	-6.83 in/yr²	-5.38 in/yr²

- ■ 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 (9/27/2023) Point Count: 76

	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	+0.20 in/yr	-2.42 in/yr	-2.62 in/yr
Acceleration:	+1.38 in/yr²	-6.91 in/yr²	-8.29 in/yr²

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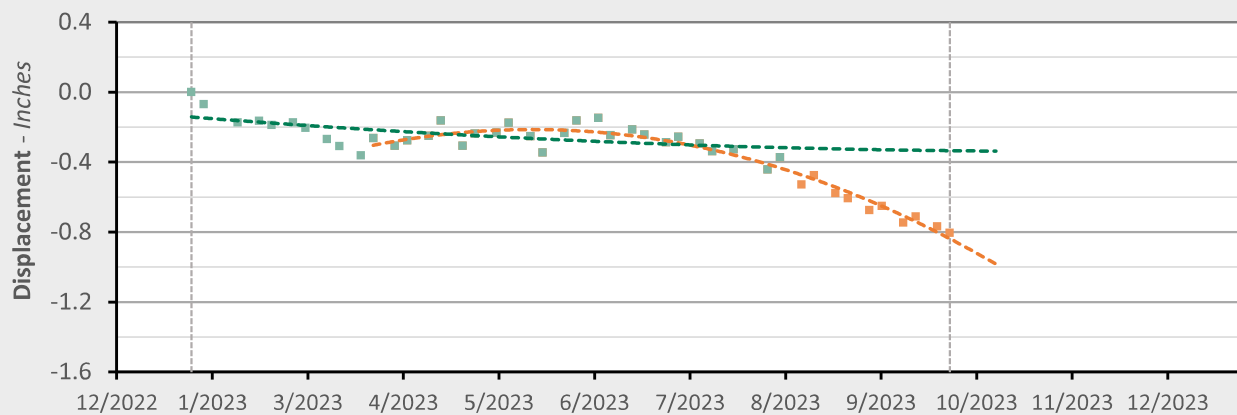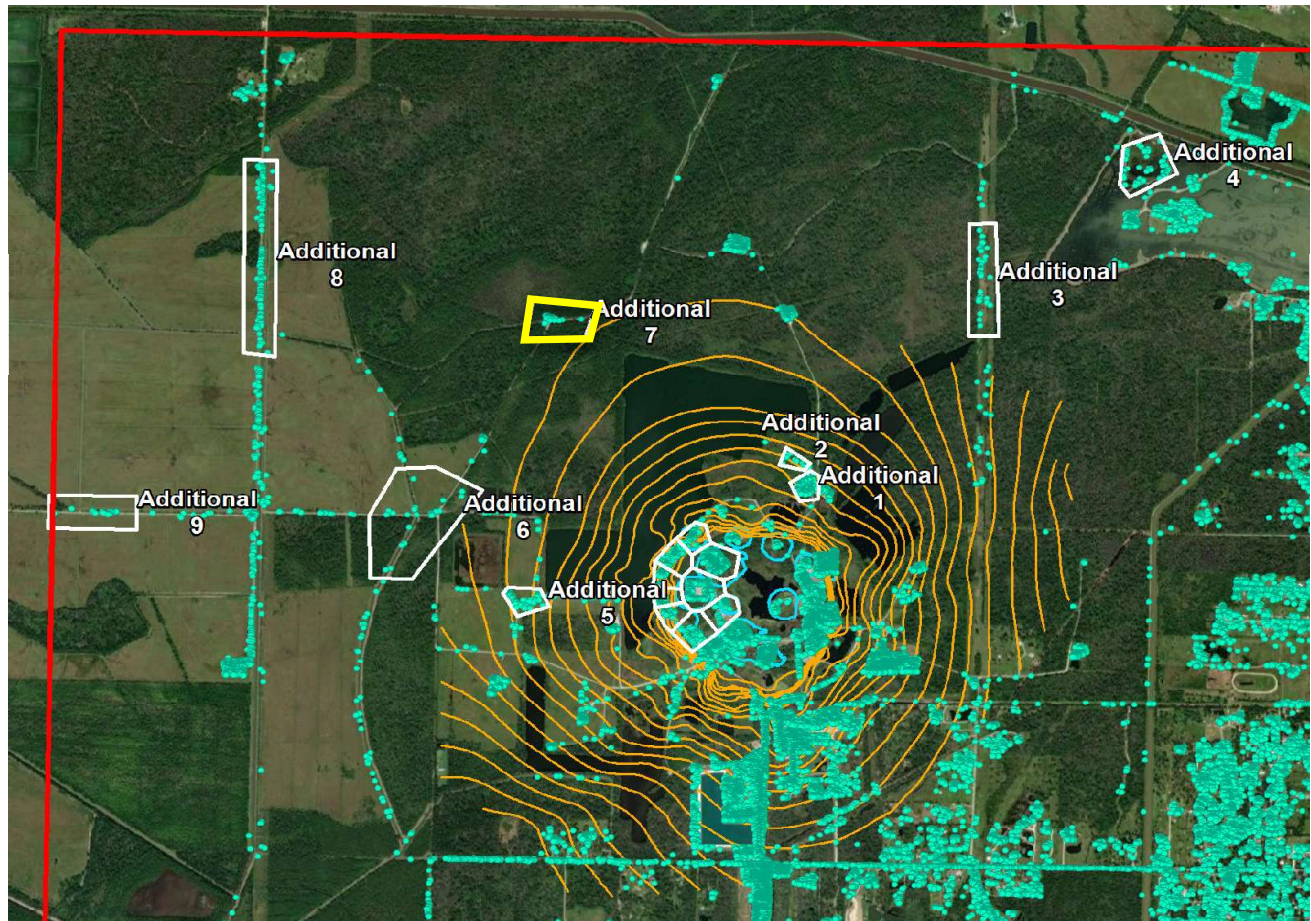- Recent LOS Displacement Measurement
- Recent Trend Line (Quadratic Regression)

Additional 6 - Location Map

Additional 6 - Displacement Time Series   TSX/PAZ (9/27/2023) Point Count: **24**

	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	-0.17 in/yr	-3.36 in/yr	-3.20 in/yr
Acceleration:	+0.64 in/yr^2	-9.07 in/yr^2	-9.71 in/yr^2

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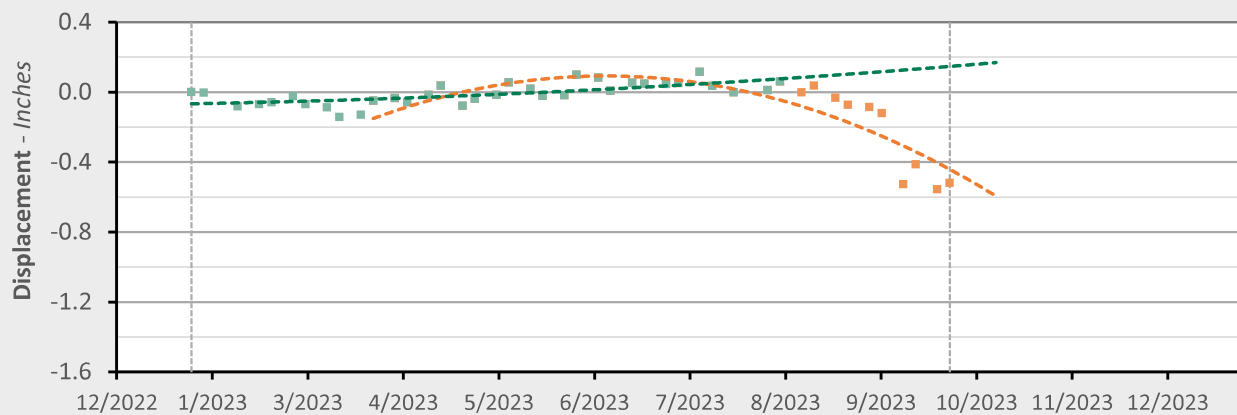- Recent LOS Displacement Measurement
- Recent Trend Line (Quadratic Regression)

Additional 7 - Location Map

Additional 7 - Displacement Time Series   TSX/PAZ (9/27/2023) Point Count: **26**

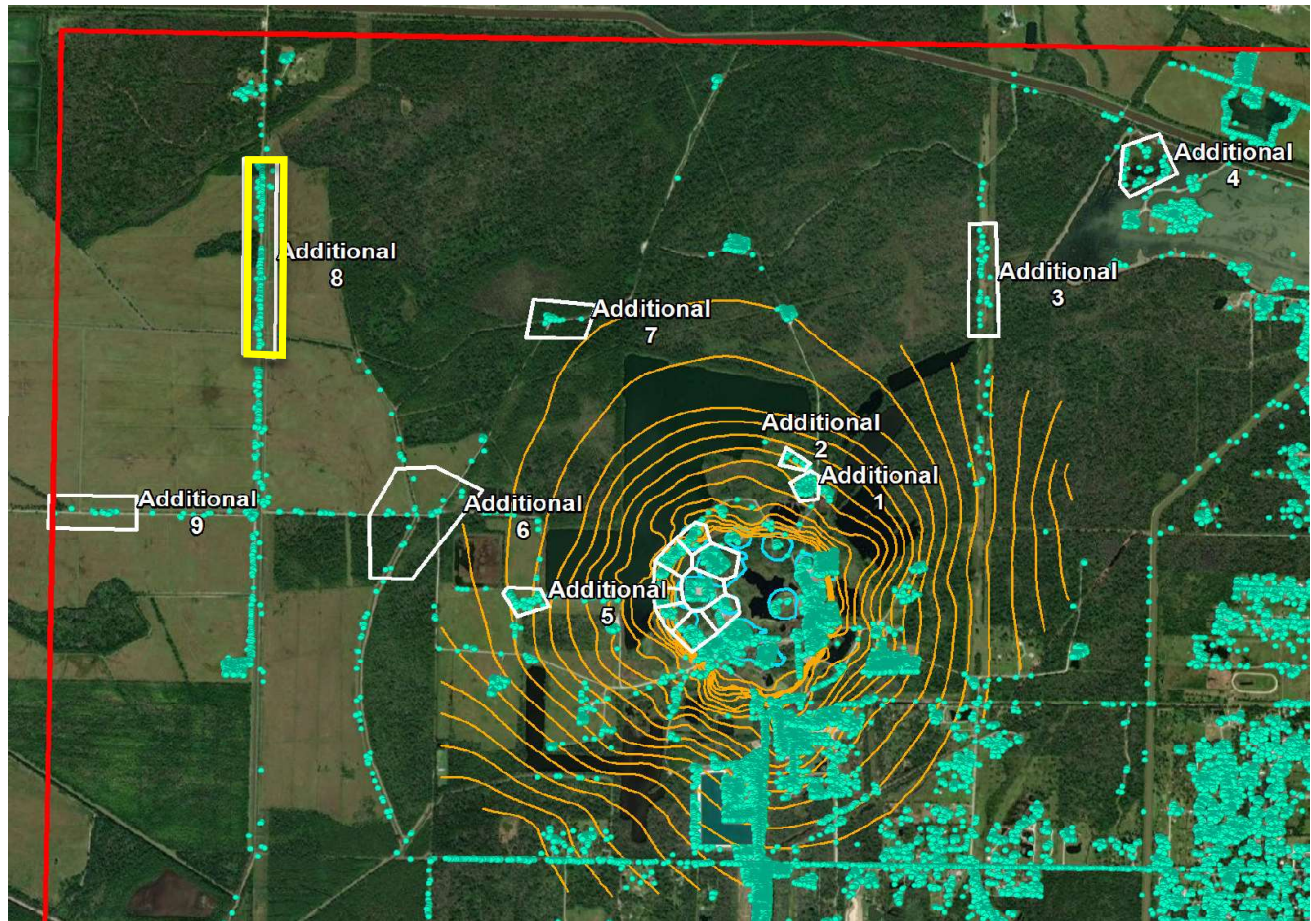|	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	+0.43 in/yr	-3.49 in/yr	-3.92 in/yr
Acceleration:	+0.59 in/yr²	-11.42 in/yr²	-12.01 in/yr²

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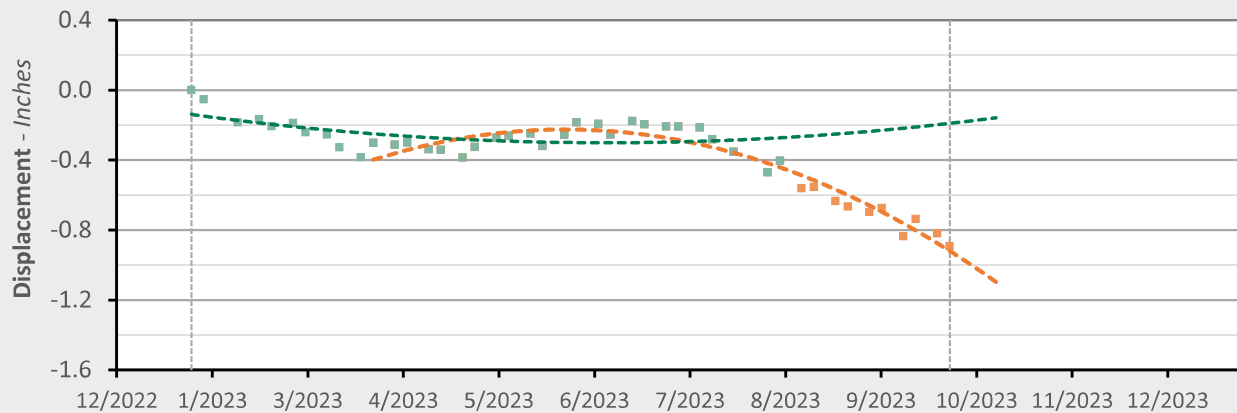- Recent LOS Displacement Measurement
- Recent Trend Line (Quadratic Regression)

Additional 8 - Location Map

Additional 8 - Displacement Time Series   TSX/PAZ (9/27/2023) Point Count: **203**

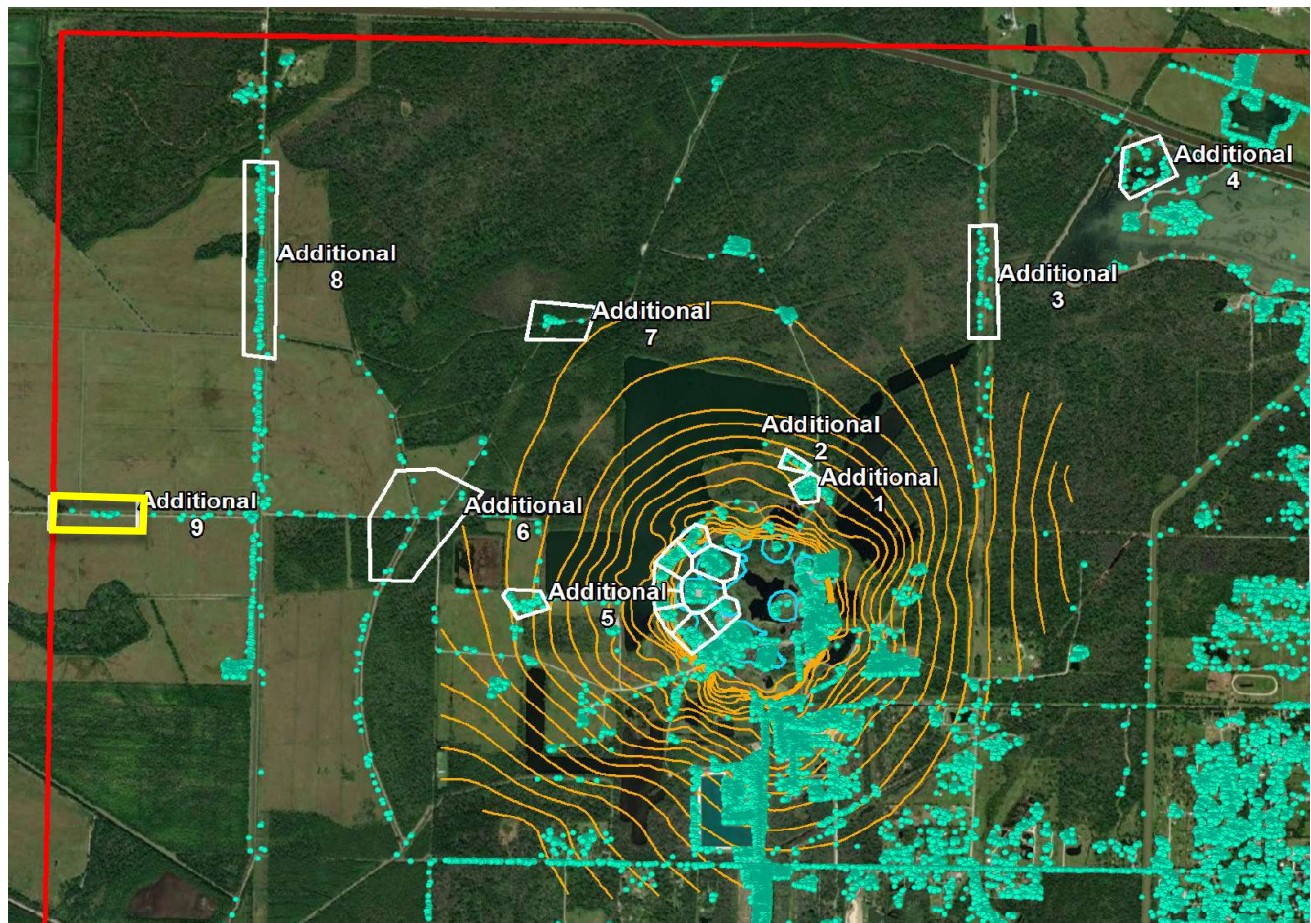|	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	+0.37 in/yr	-4.07 in/yr	-4.43 in/yr
Acceleration:	+2.38 in/yr²	-11.91 in/yr²	-14.29 in/yr²

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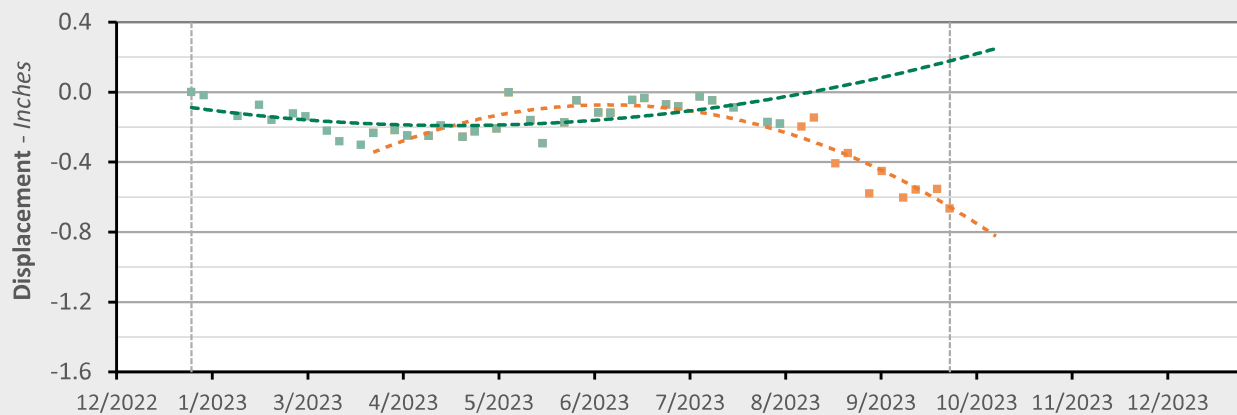- Recent LOS Displacement Measurement
- Recent Trend Line (Quadratic Regression)

Additional 9 - Location Map

Additional 9 - Displacement Time Series   TSX/PAZ (9/27/2023) Point Count: **21**

	As of 8/3/23	3/24/2023 - 9/27/23	Trend Change
Velocity:	+1.10 in/yr	-3.83 in/yr	-4.93 in/yr
Acceleration:	+3.79 in/yr^2	-12.58 in/yr^2	-16.37 in/yr^2

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