

Mead Environmental Sampling Results



Shannon L. Bartelt-Hunt
Department of Civil and Environmental Engineering

IN OUR GRIT, OUR GLORY™

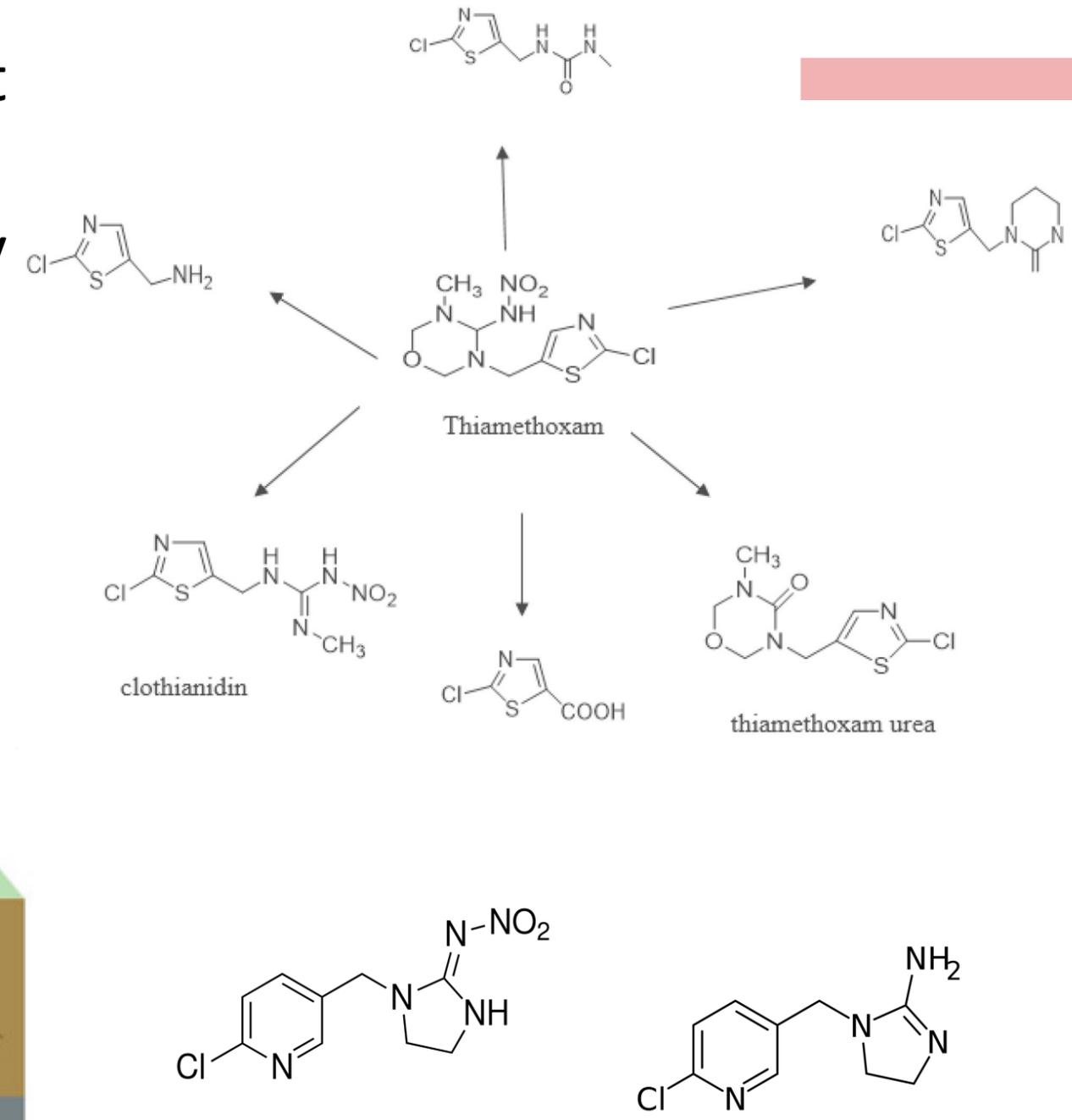
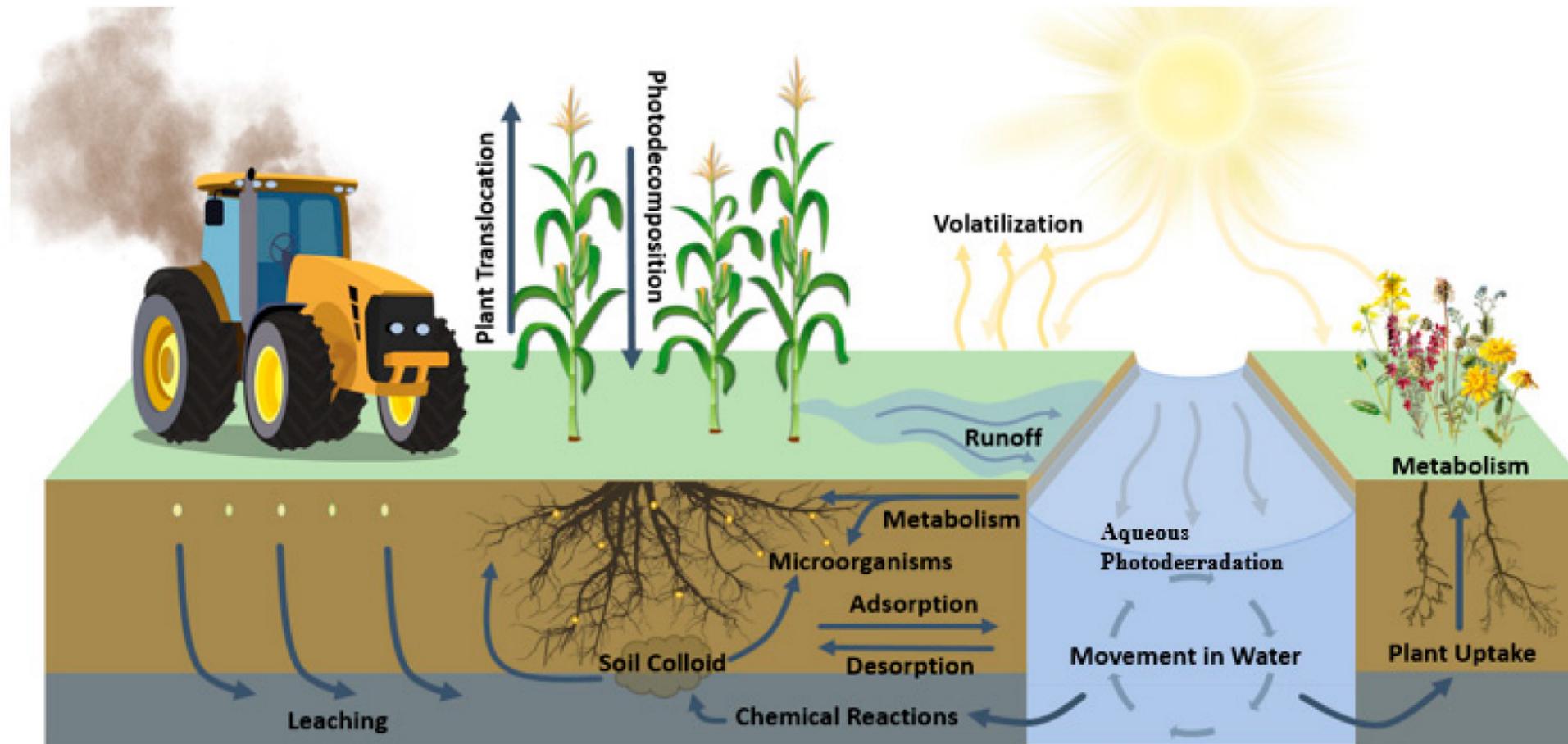
Environmental Sampling Conducted To Date

- ❖ **Environmental Sampling led by Shannon Bartelt-Hunt, Department of Civil and Environmental Engineering and Dan Snow, Director of the Water Sciences Lab**
- ❖ **Many types of environmental samples being collected**
 - ❖ Surface Water Sampling conducted monthly from April 2021 – October 2021, started again in April 2022
 - ❖ Air Sampling – conducted in March 2021
 - ❖ Surface Soil Sampling – conducted in October 2021
 - ❖ Sampling at Mead Cattle – conducted in November 2021
 - ❖ Deep Core Sampling – conducted in March 2022
 - ❖ USGS Drinking Water Study – conducted in June 2022



Neonicotinoid Insecticide Can Degrade in the Environment

Transformation products can retain toxicity

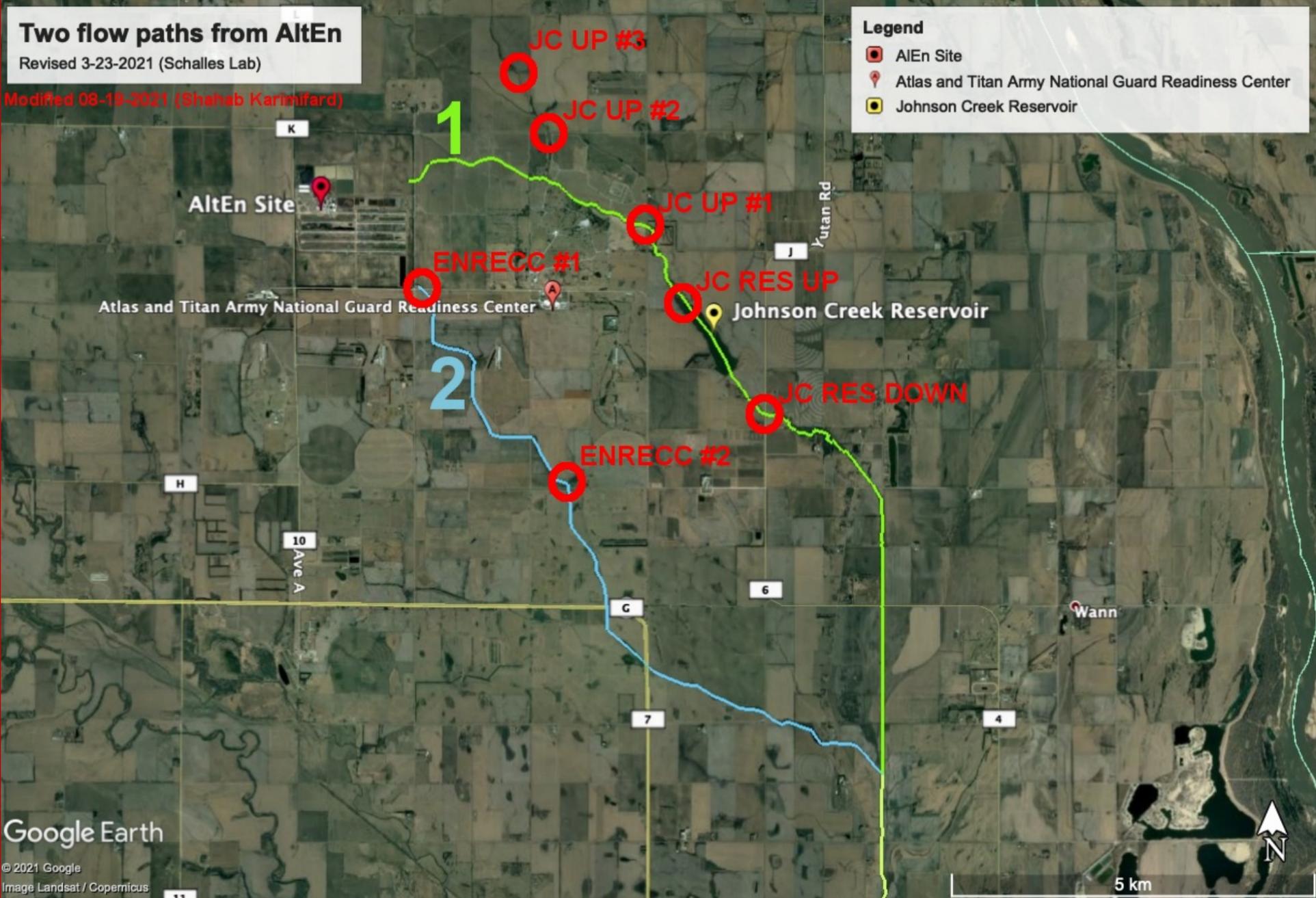


Imidacloprid → Imidacloprid desnitro
 Imidacloprid desnitro may have greater mammalian toxicity

Borsuah, J.F.; Messer, T.L.; Snow, D.D.; Comfort, S.D.; Mittelstet, A.R. Literature Review: Global Neonicotinoid Insecticide Occurrence in Aquatic Environments. *Water* **2020**, *12*, 3388.

Loser, D., Grillberger, K., Hinojosa, M.G. *et al.* Acute effects of the imidacloprid metabolite desnitro-imidacloprid on human nACh receptors relevant for neuronal signaling. *Arch Toxicol* **95**, 3695–3716 (2021).

Surface Water Sampling



Contaminants Detected in Surface Water Grab Samples

- **14 parent neonicotinoid/fungicide compounds**
- **7 neonicotinoid transformation products were selected to be monitored in the surface waters adjacent to the AltEn study area**
- **13 of the 21 were detected in the surface water.**
- **Both parent compounds and transformation compounds detected**

Contaminant status	Contaminant name	Number of contaminants
Not detected at all	Acetamiprid, Dimethoate, Dinotefuran, Indoxacarb, Sulfoxaflor, Thiacloprid, 6-Chloronicotinic aldehyde, Imidacloprid olefin	8
Only detected on route 1 (Johnson Creek)	-	0
Only detected on route 2 (ENREC)	6-Chloronicotinic acid	1
Detected on both routes	Azoxystrobin, Clothianidin, Imidacloprid, Metalaxyl, Picoxystrobin, Pyraclostrobin, Thiamethoxam, Trifloxystrobin, 6-Chloro-N-methylnicotinamide, Imidacloprid desnitro, Imidacloprid urea, Thiamethoxam urea	12



Initial Findings from Surface Water

- ❖ **We are detecting both the parent compounds as well as degradation products in surface water**
- ❖ **We are establishing what may be considered a 'background' level from use of treated seed for crop production in the area**
- ❖ **Concentrations are increasing downstream with highest concentrations in the Johnson Creek reservoir**



Air Sampling

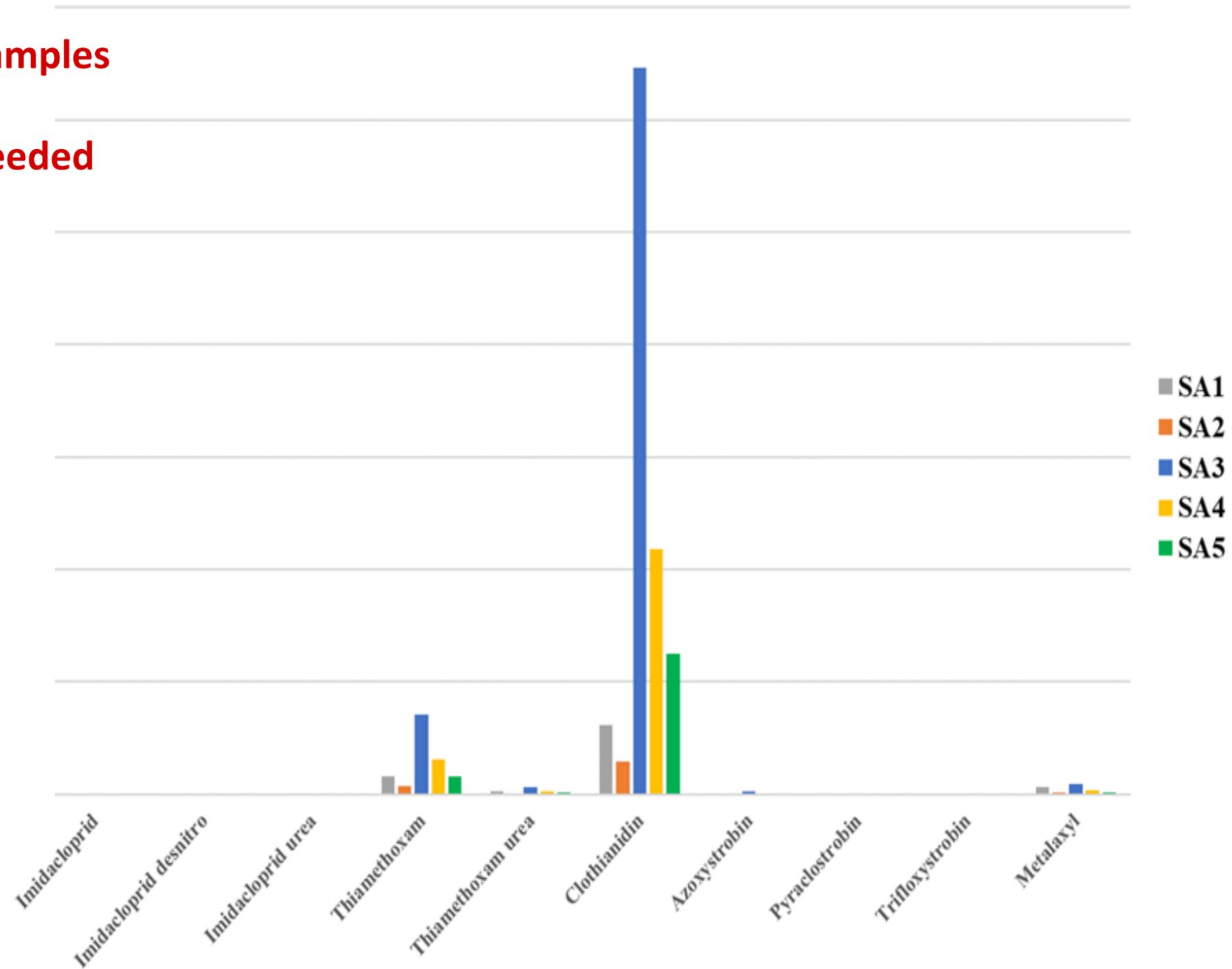


Air Sampling Results

- ❖ Similar to water, samples were tested for 14 parent neonicotinoid/fungicide compounds and 7 neonicotinoid transformation products
- ❖ 10 contaminants were detected in air samples
- ❖ Preliminary data and conversions are needed



Concentration



Data is still being collected and analyzed

- **Surface soils data and deep cores are being analyzed**
- **We are continuing to collect environmental samples including surface water, soil, groundwater and drinking water**
- **A drinking water study is being done in collaboration with USGS**



- **We will be continuing environmental sampling in 2022**
- **We will be expanding our study area out further from the plant**
- **We will initiate our own groundwater sampling/drinking water sampling**

