

# IMPROVE Carbon Analysis Update

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# Objectives

- Report status of IMPROVE carbon analyses
- Discuss ongoing research and development

# DRI's Environmental Analysis Facility (EAF) continuously operates 10-13 Model 2015 Multiwavelength Carbon Analyzers

(January 2016-April 2023, analyzed ~277,620 samples with ~128,650 for IMPROVE)



EAF Carbon Laboratory (Magee Scientific, Berkeley, CA and Aerosol, d.o.o., Ljubljana, Slovenia)

# Carbon Laboratory Operations

- Received an average of 1,450 IMPROVE samples per month (varies from 400 to 2,400).
- Analyzed 14,082 IMPROVE samples from May 2022 to April 2023.
- **Operated 10–13 hours per day, 5–7 days a week depending on sample numbers.**
- Matt Claassen has assumed responsibility since June 2021 in conjunction with Patrick Myers, who started September 2021.

Matt



Pat



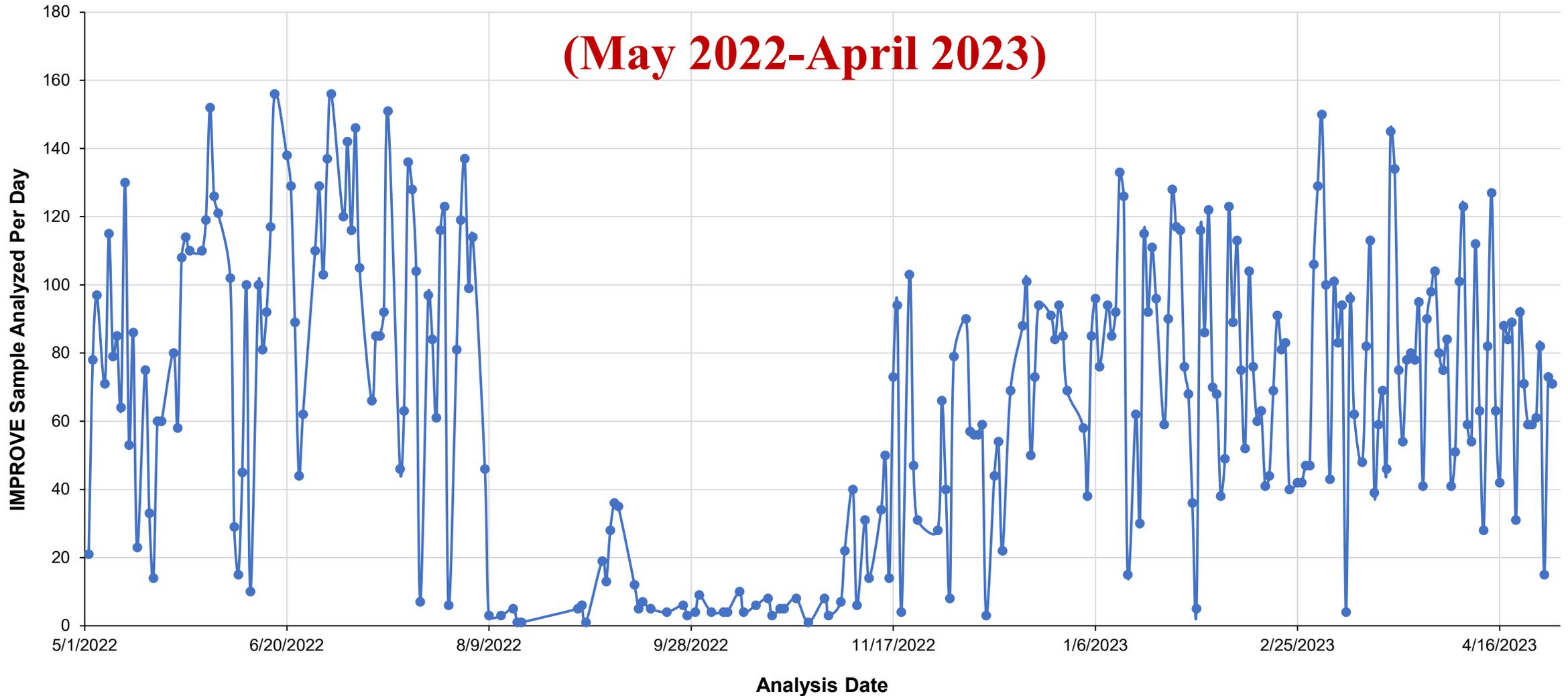
# Expect to Complete 2022 Sample Analysis by Mid June 2023

<b>Sampling Period</b>	<b>Samples Received Dates</b>	<b>Number of Samples Received</b>	<b>Analysis Completion Date</b>
<i>5/1/22 – 12/31/22</i>	<i>5/12/22- 3/22/23</i>	12,280	Mid June 2023
<i>1/1/23 – 4/30/23</i>	<i>2/9/23 - 5/24/23</i>	5,400*	Late August-September 2023 (est.)

*\*As of 5/23/23*

# Carbon throughput averaged ~ 68 samples per workday (~ 9 samples per analyzer)\*

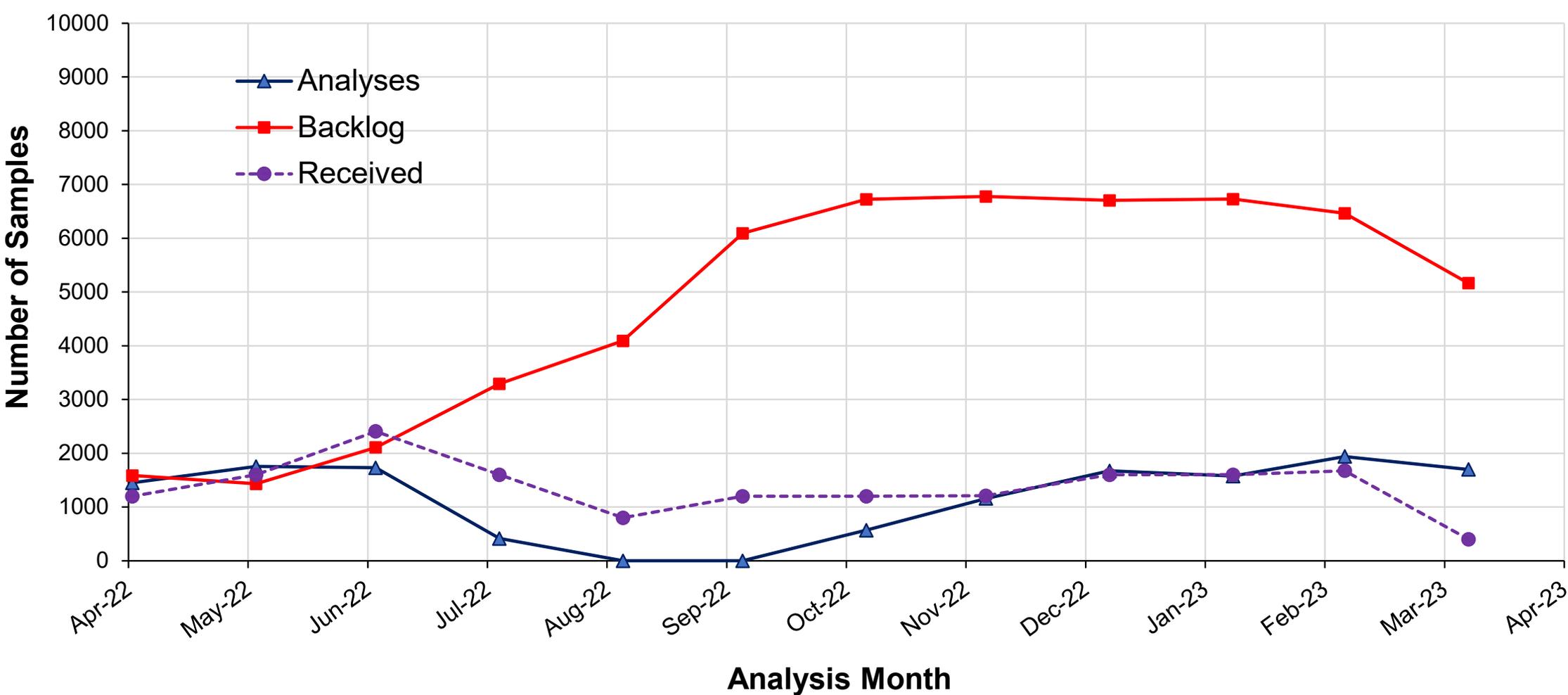
**(May 2022-April 2023)**



\*Excludes calibration runs and other projects

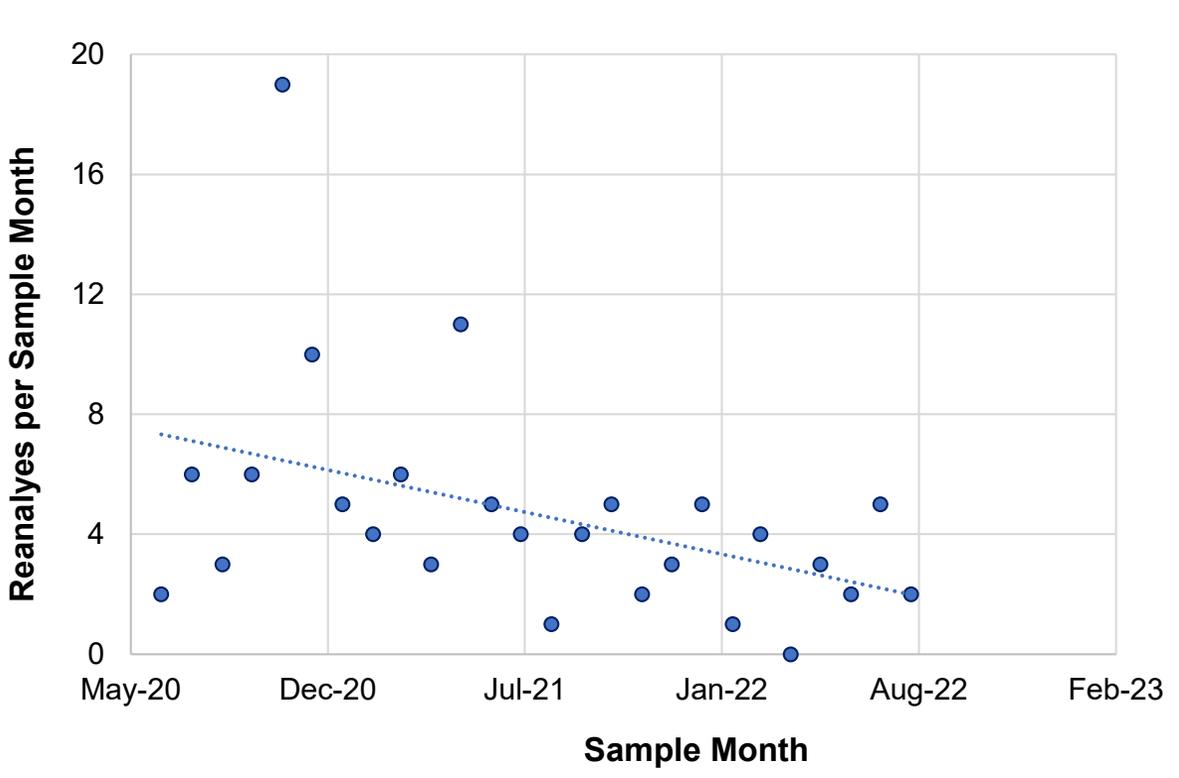
# Carbon backlog and throughput remained stable

(May 2022 – April 2023)

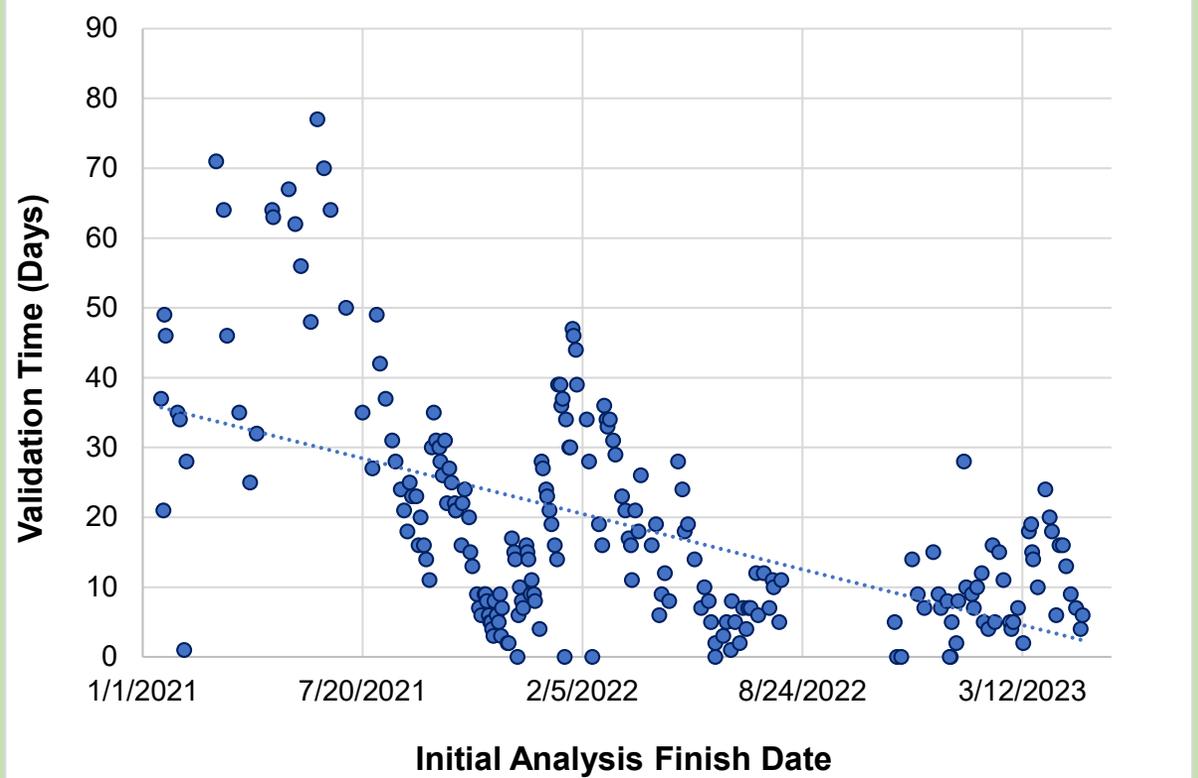


# Streamlined data processing and validation have reduced reanalysis rates and shortened the reporting time

## Reanalysis



## Validation Time



# Ongoing Research: Comparison of Carbon Measurements



ARA N-FRM → IMPROVE\_A (EC and attenuation at 7 wavelengths)



DST ObservAir → BC (880 nm) and BrC (405 nm)



Magee Carbonaceous Aerosol Speciation System → TC, BC, and absorption at 7 wavelengths

# Ongoing Research: Testing New DRI Model 2015 Carbon Analyzer with an Autoloader



# Ongoing Research: Brownness of Organic Aerosols

- A total 18,044 samples from 158 IMPROVE sites in 2016;
- Brownness index:  $\gamma_{Br} = BrC/OC$ ;
- High winter brownness is likely related to residential wood combustion and low photobleaching;
- Photobleaching reduced brownness in summer, even for samples affected by wildfire (Sawtooth and Domeland).

