

Background

- 10 sites across New Hampshire (Figure 1)
- Variety of stream orders & land uses

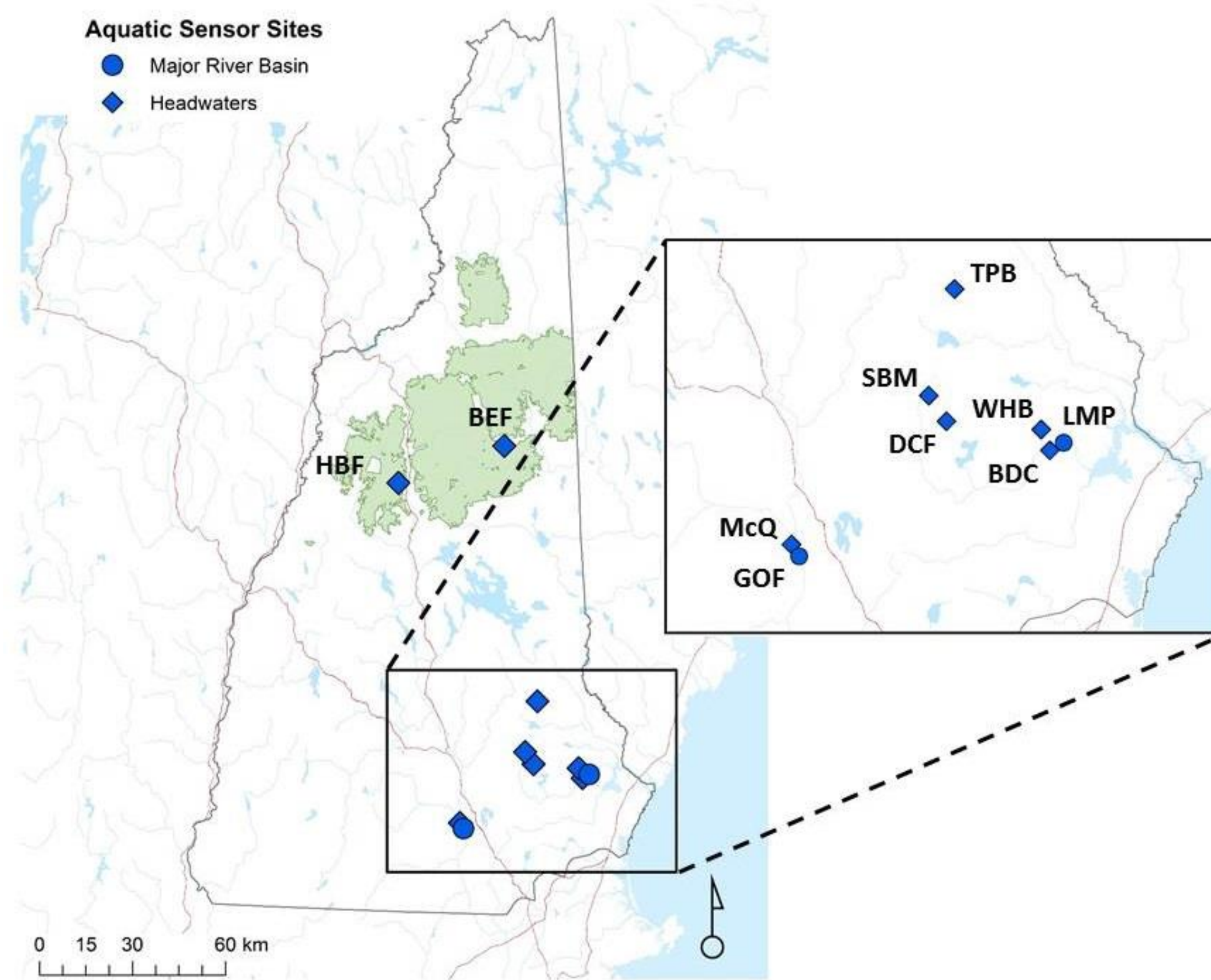


Figure 1 - Water quality sensor locations in New Hampshire

- Year round water quality data at 15 minute interval:



Satlantic SUNA

- Nitrate
- Abs 254



YSI EXO2

- Temperature
- Conductivity
- Fluorescent Dissolved Organic Matter (fDOM) (Surrogate for DOC)
- Turbidity
- Dissolved Oxygen
- pH

- Cell telemetry allows for data updates daily

Routine Protocols

- Sensor calibrations scheduled at 5% SUNA lamp life (approx. every 6 weeks based on sample regime)
- Sensors rotate from site to site
- Weekly grab samples at each site for validation

Nitrate Sensor Performance

-Leaf Leachate Interference

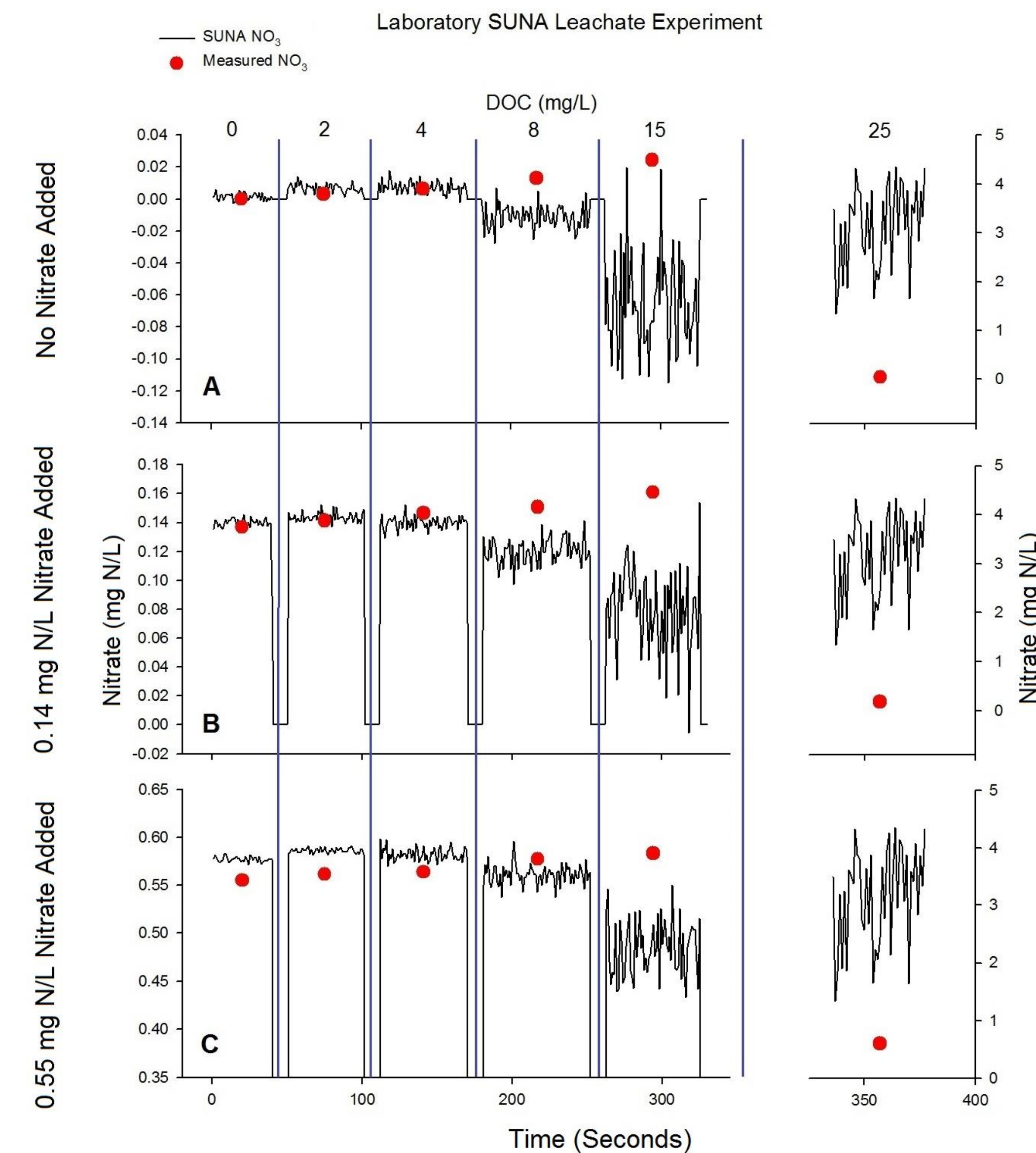


Figure 2 - SUNA response to increasing doses of leaf leachate with zero added nitrate (A), low added nitrate (B), and moderate added nitrate (C)

-Acetate Interference

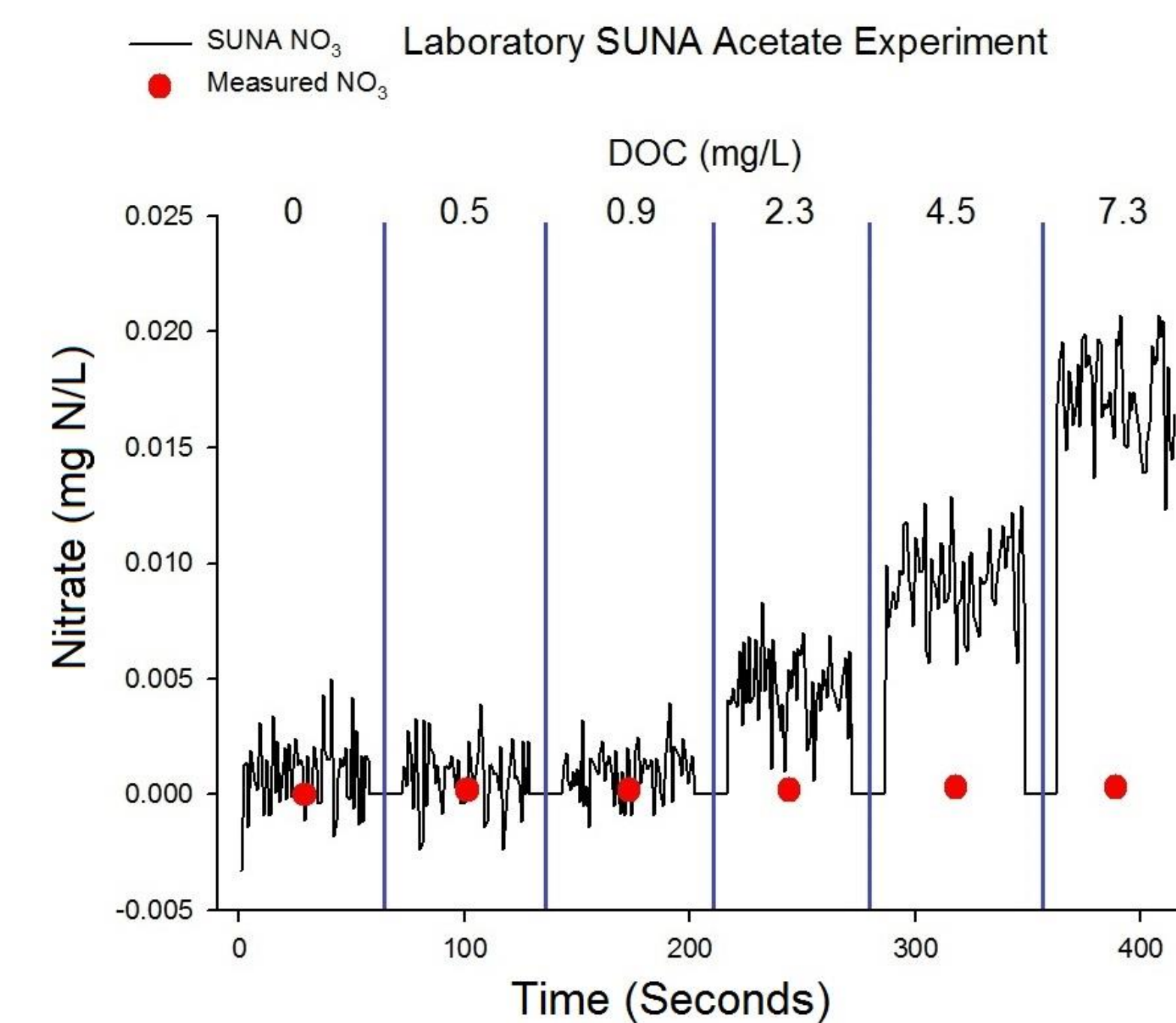


Figure 3 - SUNA response to increasing doses of acetate with zero added nitrate

-Grab Sample Comparison

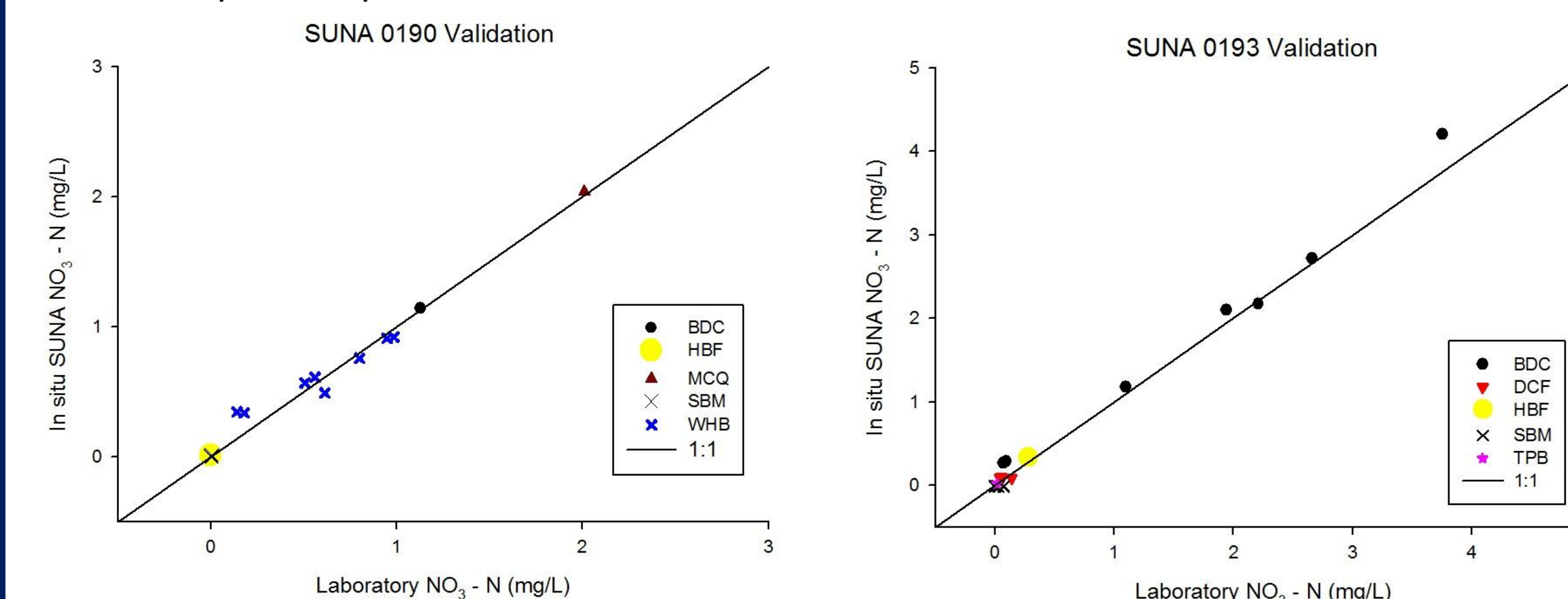


Figure 4 - Validations of 2 SUNAs comparing grab to in situ measurements across sites

Data Corrections

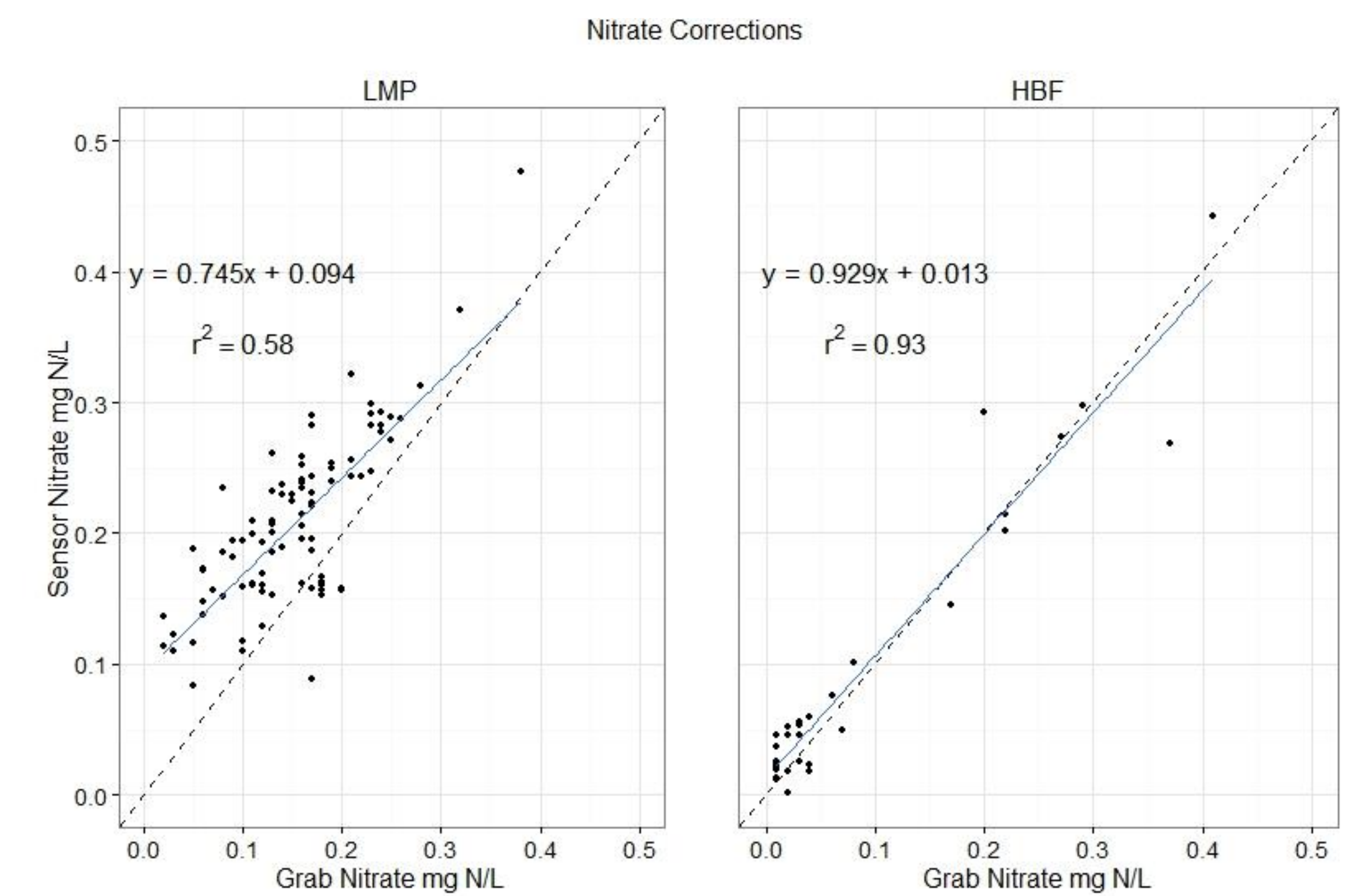


Figure 5 - Grab sample vs in situ nitrate measurements showing the relationships are site-specific

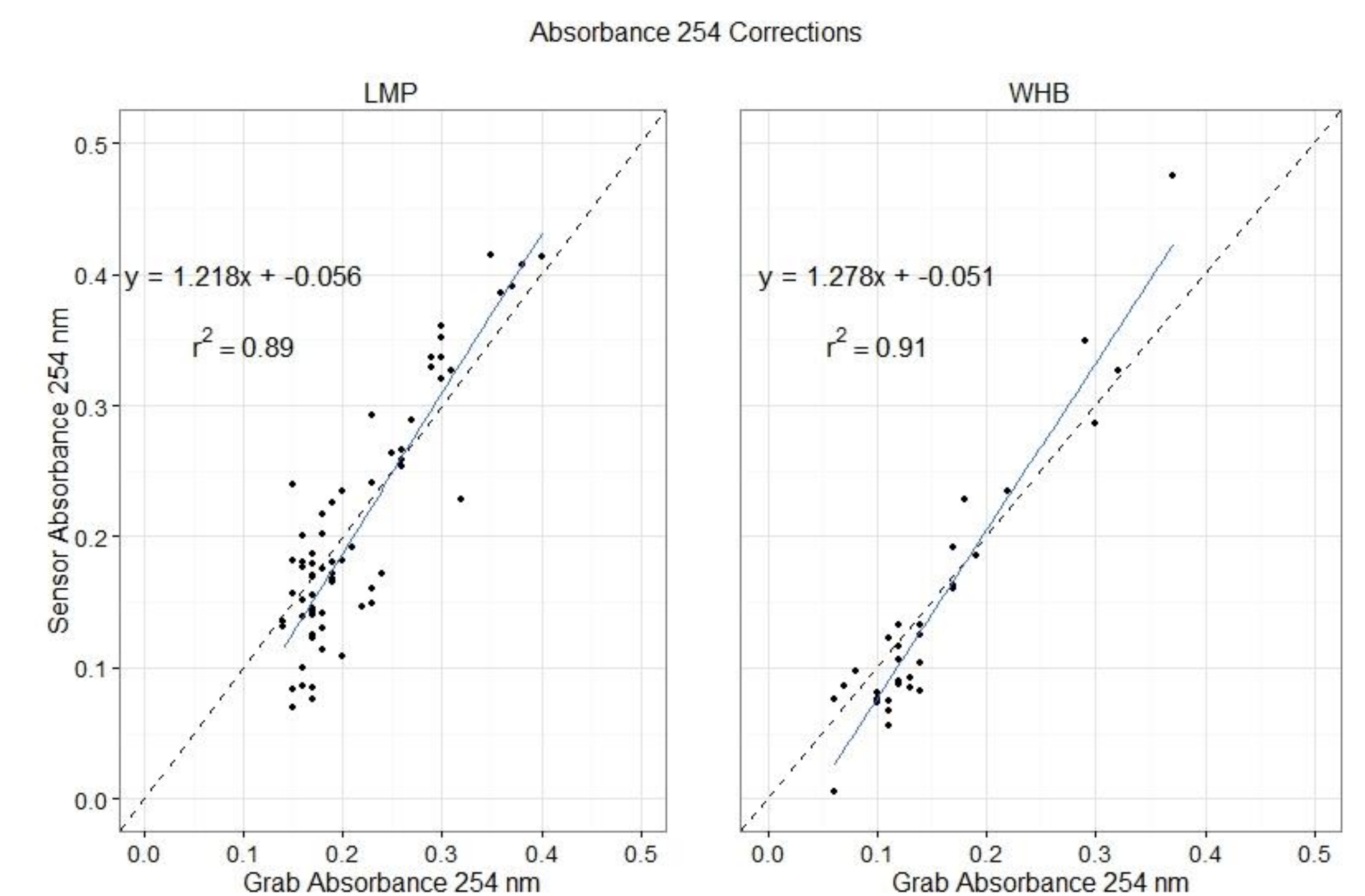


Figure 6 - Grab sample vs in situ SUNA generated Abs 254 at different sites showing the relationship appears to be very similar across sites

Conclusions:

- Nitrate offsets are clearly site-specific and not sensor-specific
- SUNA offsets can vary in magnitude and direction based on DOC type – supports that site-specific biogeochemistry will have unique effect on sensor offsets/corrections
- Other measurements (such as Abs 254) do appear to have offsets that are uniform across sites
- Maximum value achieved when YSI/SUNA deployed in tandem, data from one is used to correct data from the other