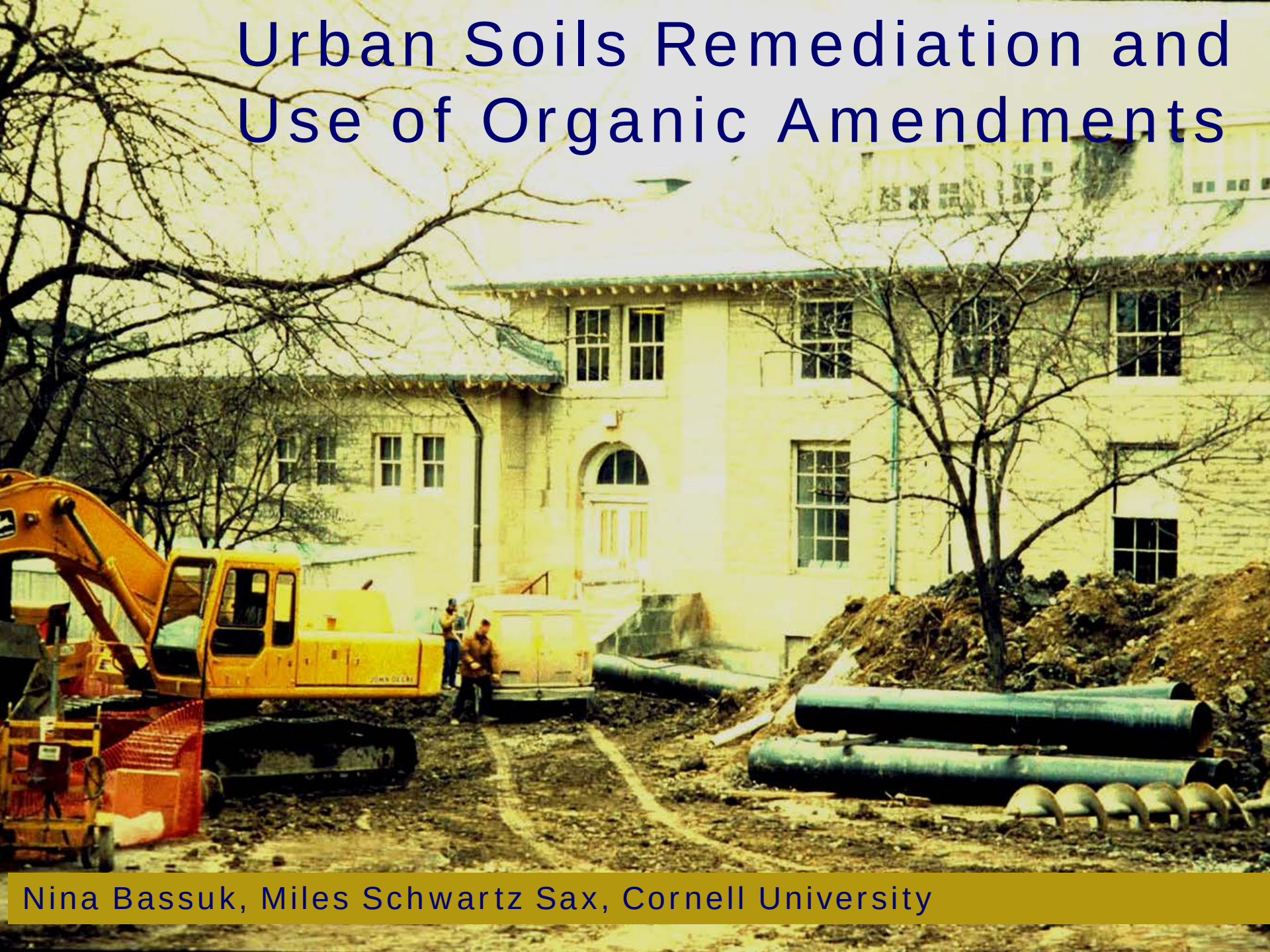
Urban Soils Remediation and Use of Organic Amendments



Nina Bassuk, Miles Schwartz Sax, Cornell University

Issue: Remediating compromised urban soils with organic matter.

- **How much organic amendment is enough?**
- **Why amend with organic compost?**
- **How to retain organic compost over time(12 year study)**

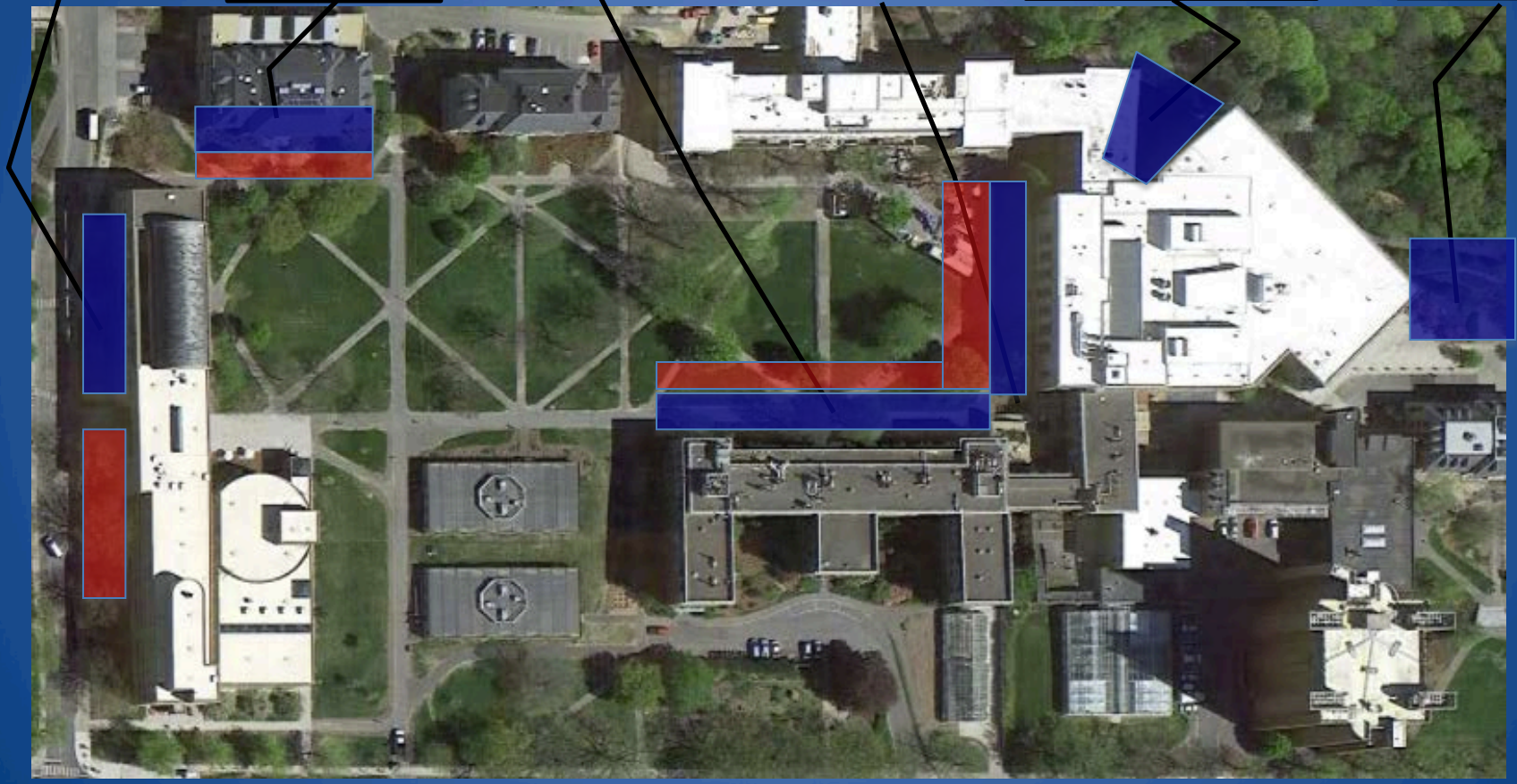

2005

How to incorporate organic matter into urban soils

- **Apply @6-8” of compost to compacted soil**
- **Use backhoe bucket to dig down to @18”**
- **Dump combined soil and compost creating veins of compost through compacted soil**

- **Plant and then mulch with 2-3” of shredded bark**
- **Re-mulch yearly to maintain 2-3” surface layer**

Study Sites



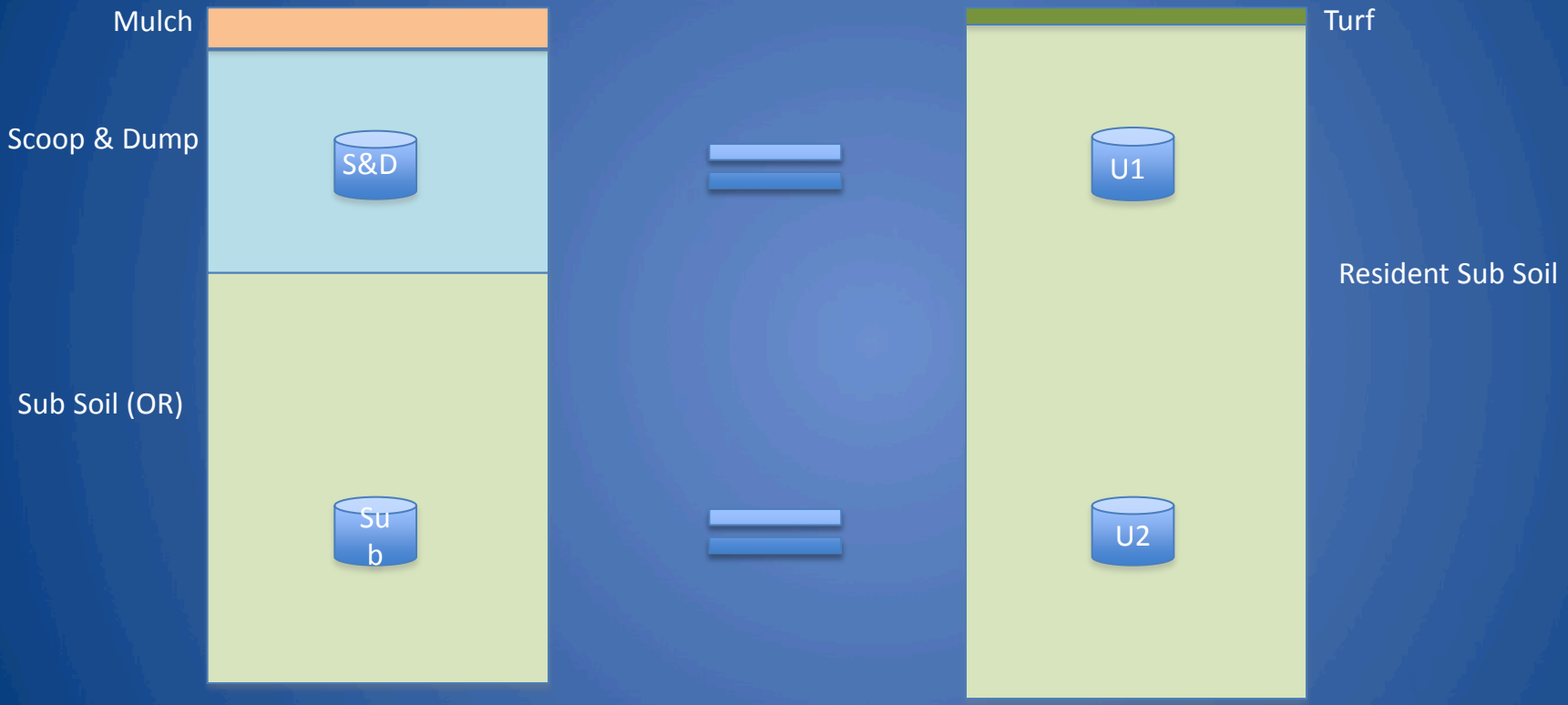
= Study Site (n=6)

= Control (n=4)

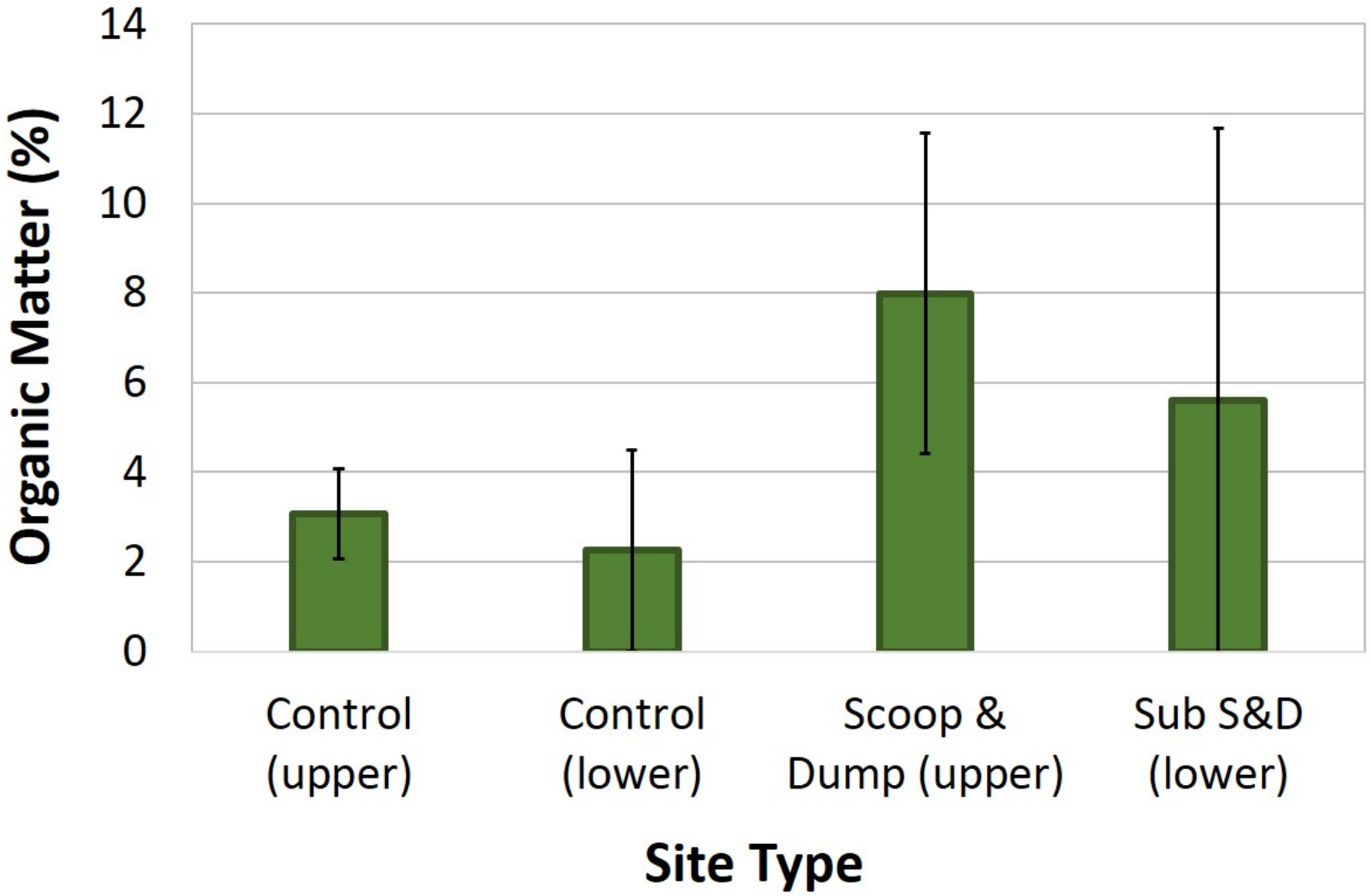
Methods: Sampling Scheme

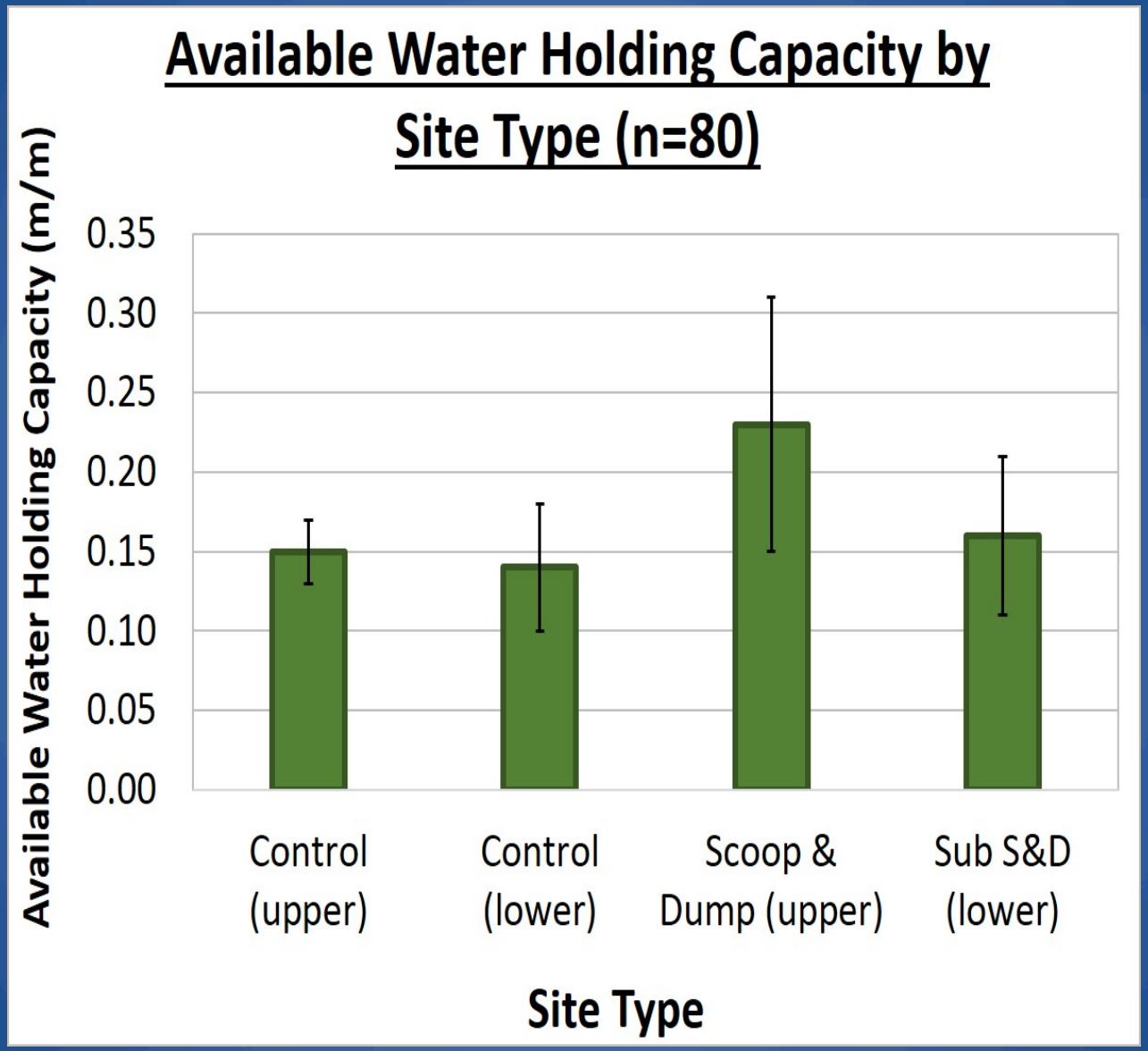
Study Site: In garden bed

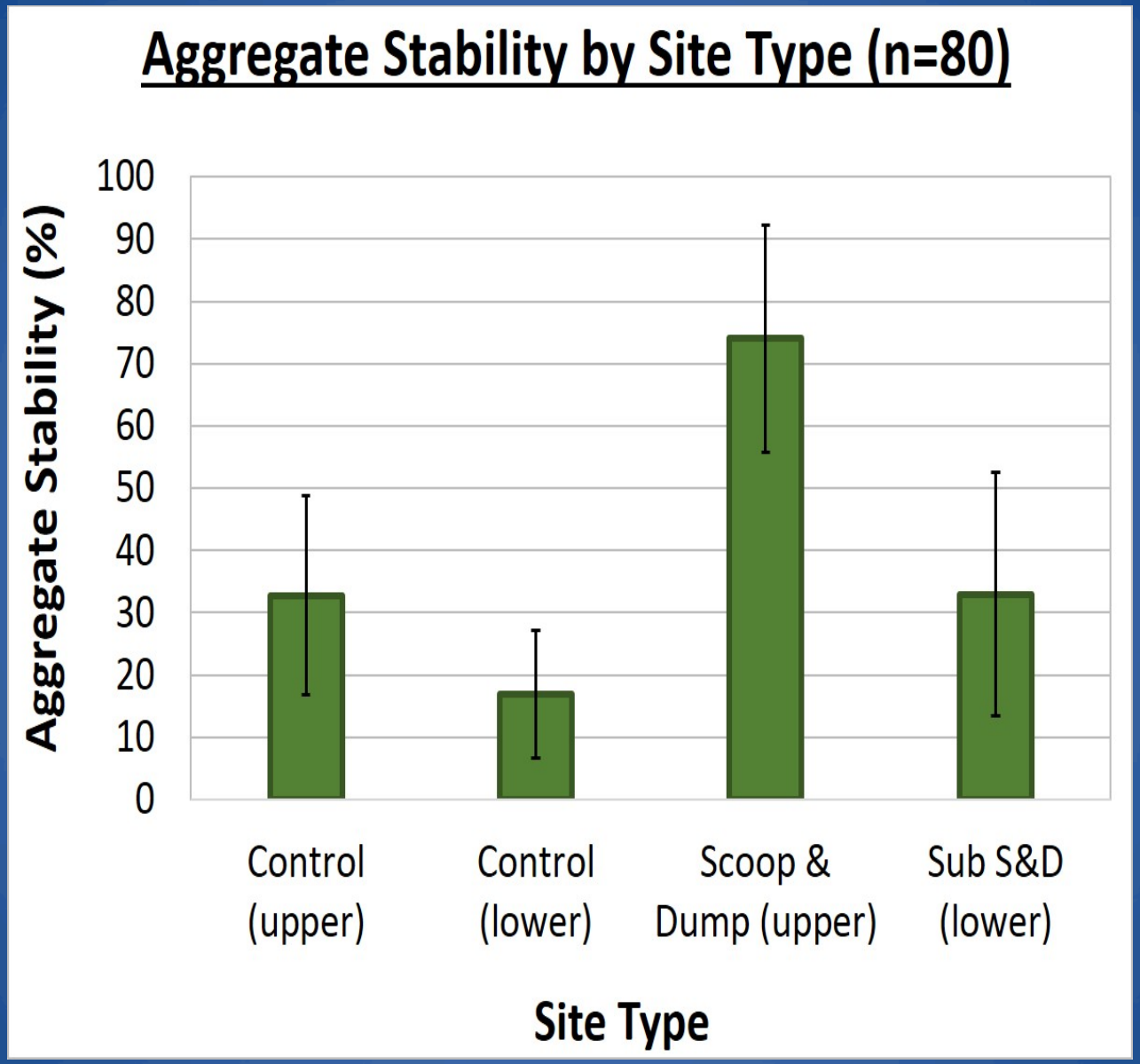
Control Site: In turf

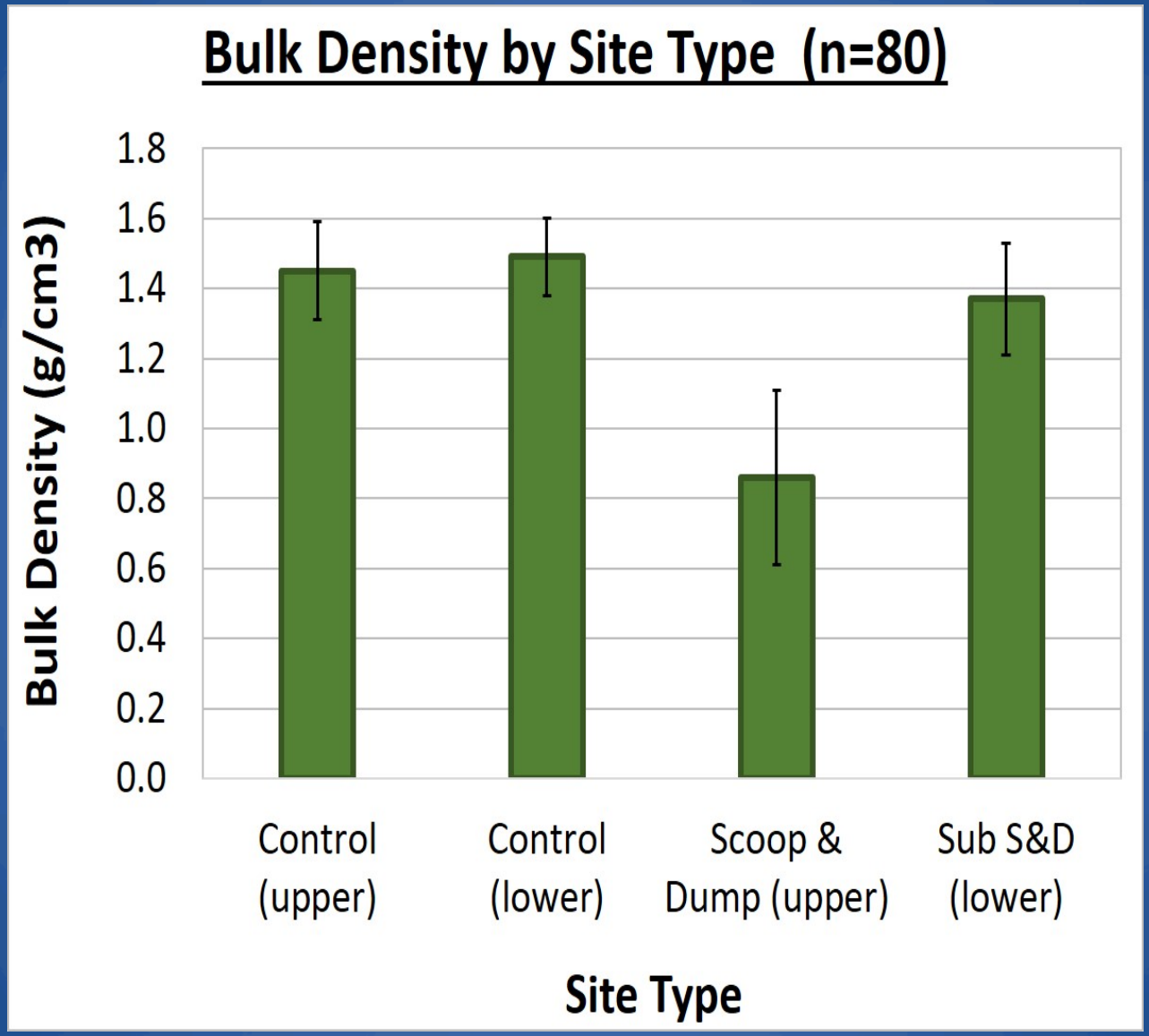


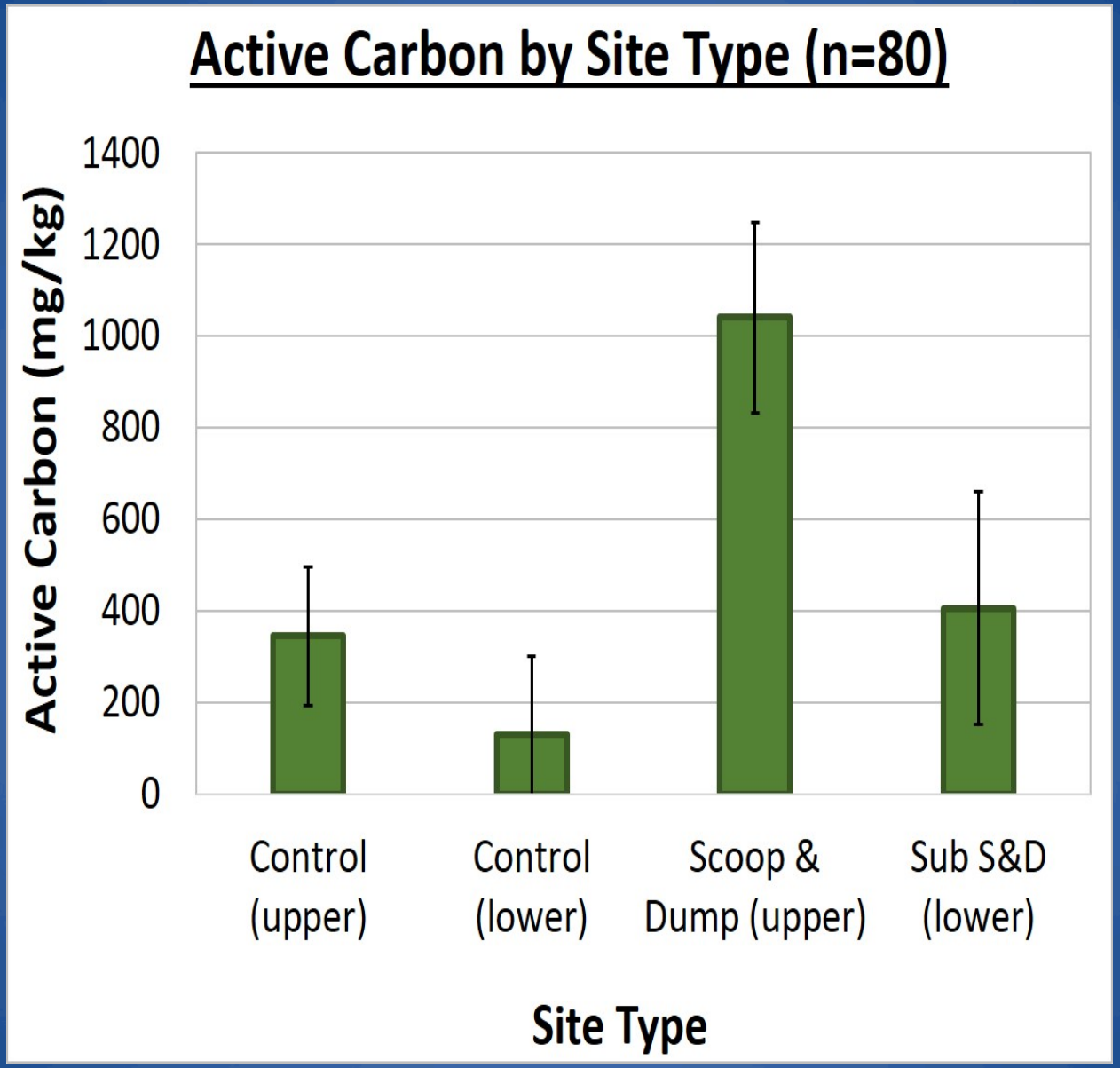
Organic Matter by Site Type (n=80)



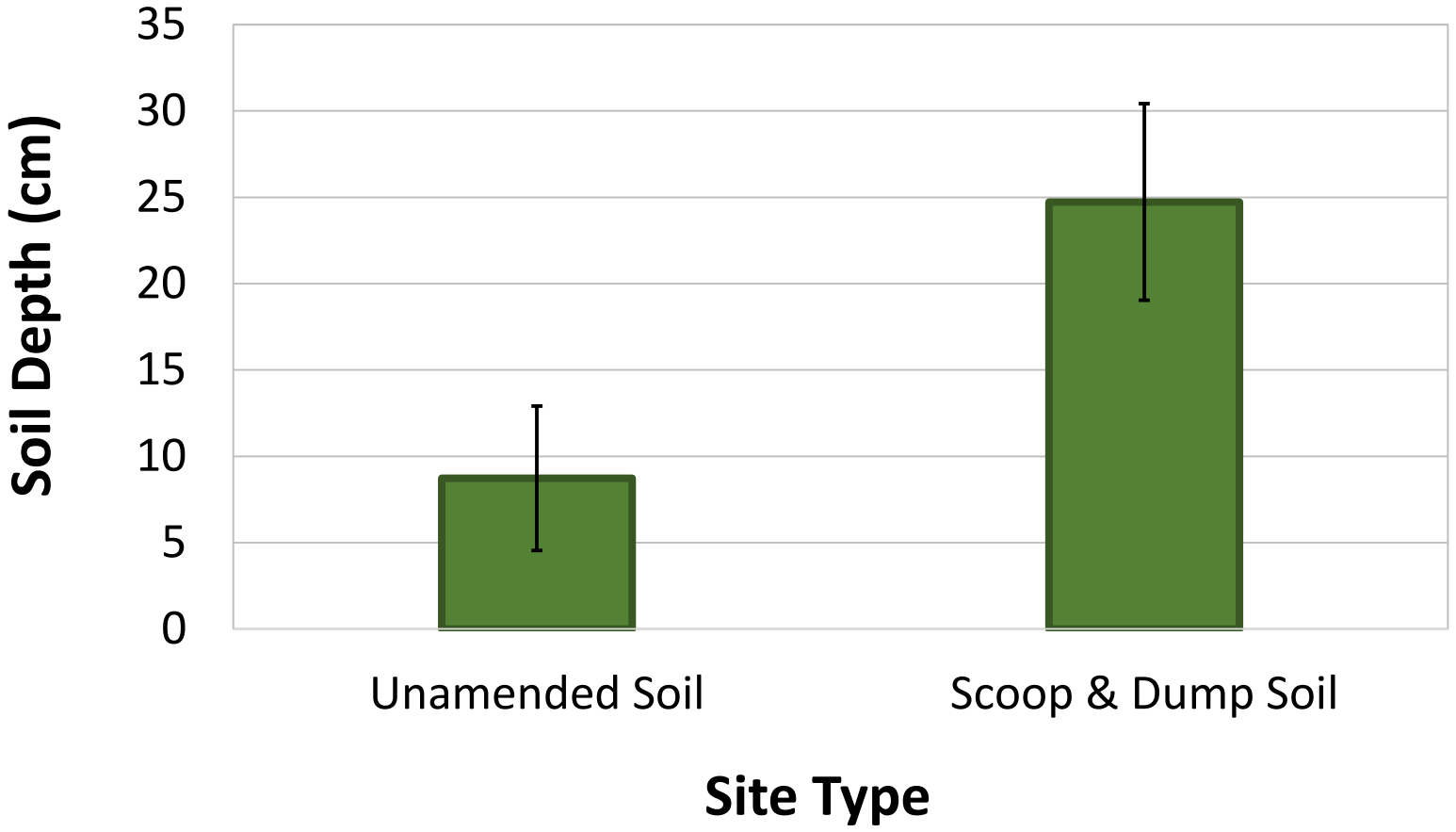

Available Water Holding Capacity by Site Type (n=80)
Available Water Holding Capacity (m/m)
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Control (upper)
Control (lower)
Scoop & Dump (upper)
Sub S&D (lower)
Site Type


Aggregate Stability by Site Type (n=80)
Aggregate Stability (%)
100
90
80
70
60
50
40
30
20
10
0
Control (upper)
Control (lower)
Scoop & Dump (upper)
Sub S&D (lower)
Site Type

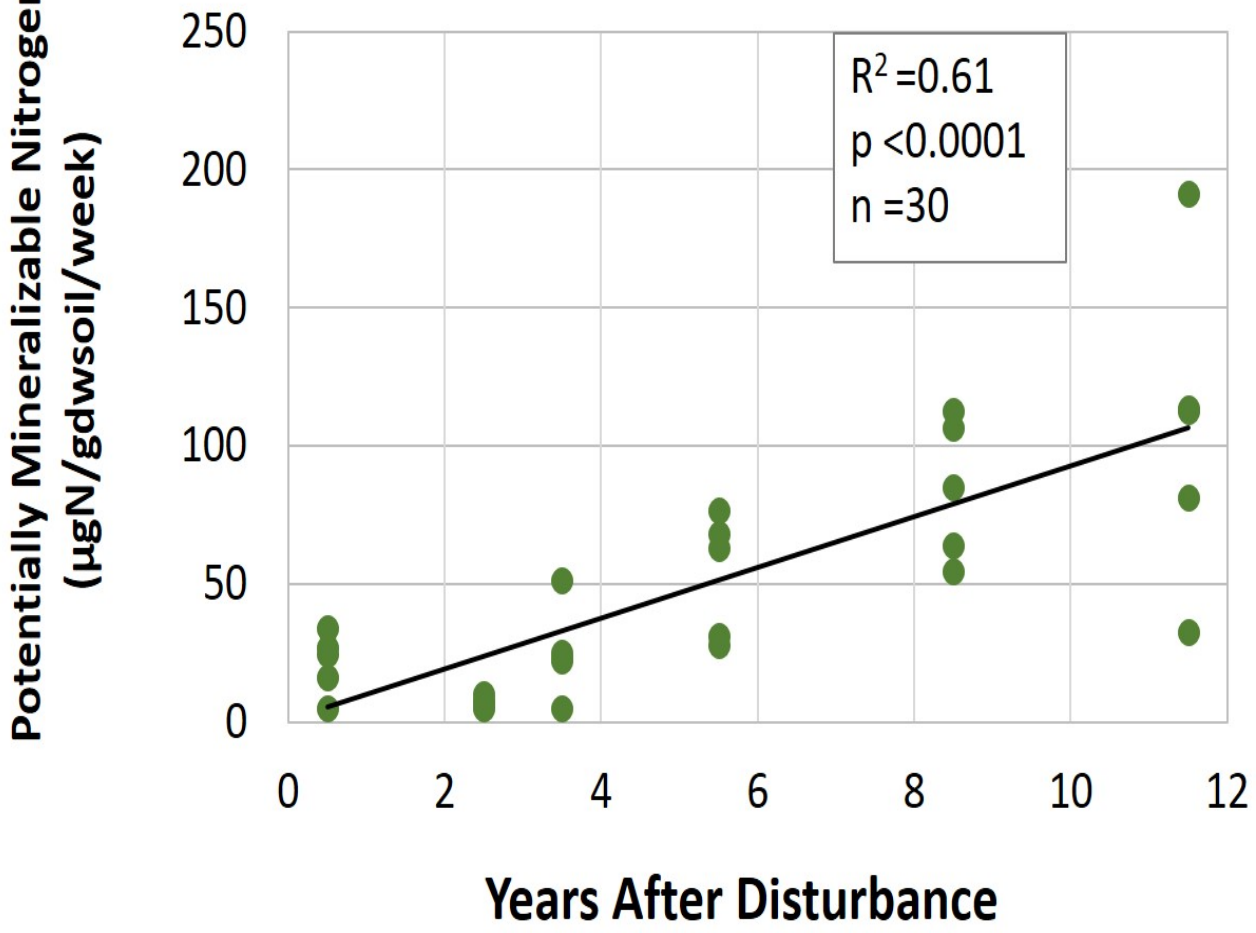

Bulk Density by Site Type (n=80)
Bulk Density (g/cm3)
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Control (upper)
Control (lower)
Scoop & Dump (upper)
Sub S&D (lower)
Site Type

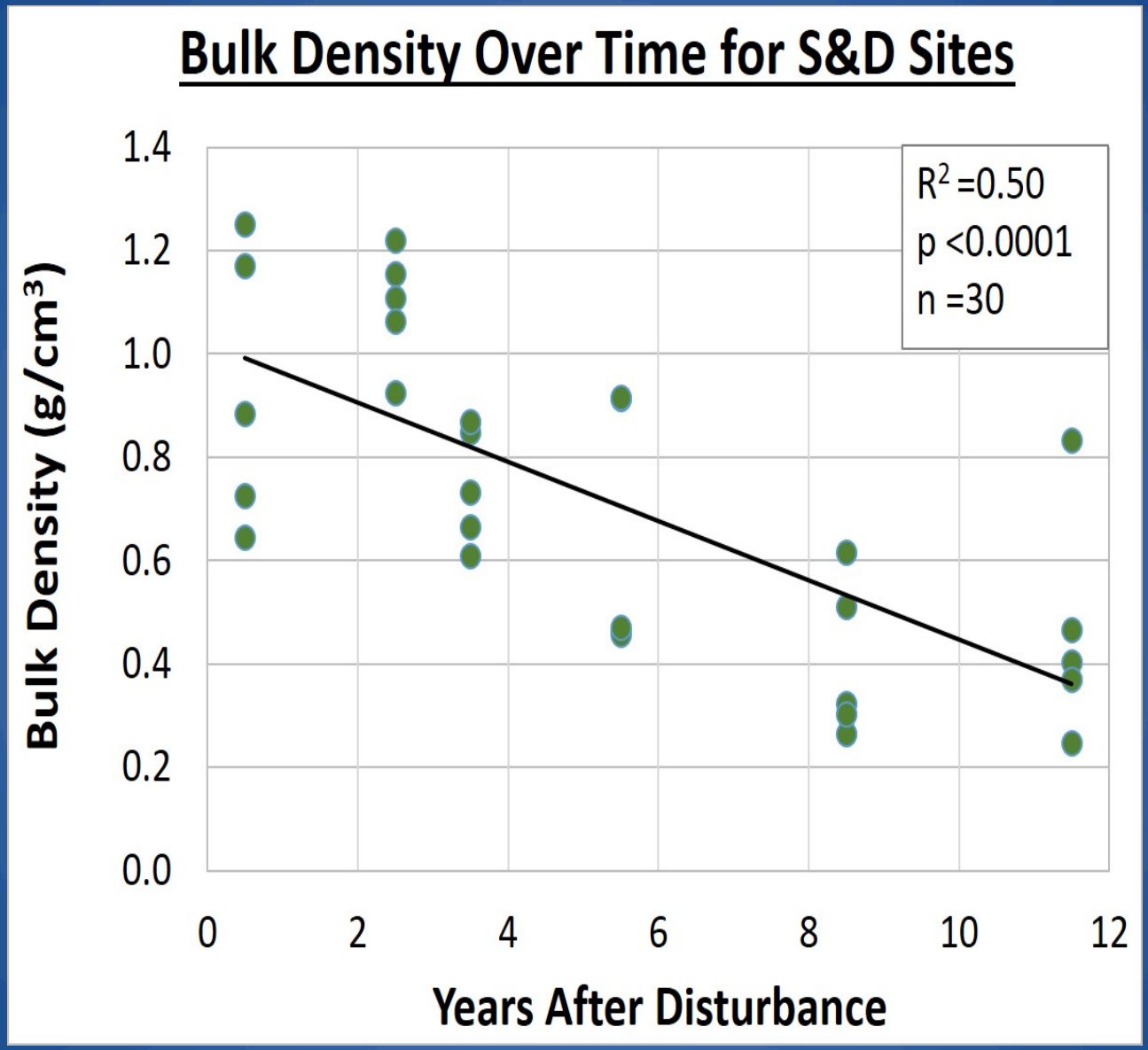

Active Carbon by Site Type (n=80)
Active Carbon (mg/kg)
1400
1200
1000
800
600
400
200
0
Control (upper)
Control (lower)
Scoop & Dump (upper)
Sub S&D (lower)
Site Type

Average Soil Depth of Root Limiting Resistance (PSI>300) by Site Type



Potentially Mineralizable Nitrogen Over Time for S&D Sites




Bulk Density Over Time for S&D Sites
Bulk Density (g/cm³)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
Years After Disturbance
R² =0.50
p <0.0001
n =30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This method has shown:

- **Soil resistance decrease**
- **Pore volume increase**
- **Reduction in bulk density**
- **Increased Carbon & Nitrogen**
- **Improved soil structure**
- **Improved aggregate stability**
- **Improved plant growth response**
- **Long term improvement of soil conditions and plant growth(12 years)**