

Restoration of meadows in the Sierra

Halstead Meadow, Sequoia National Park

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Halstead Meadow, Sequoia NP



2006

5-10% slope

Halstead Meadow, Sequoia NP



2006

5-10% slope

A photograph of a dense field of tall green grasses, likely *Scirpus microcarpus*, in a forest clearing. The grasses are vibrant green and fill most of the frame. In the background, there is a line of trees, including several tall, thin evergreens and some deciduous trees. The ground appears to be a mix of soil and low-lying vegetation. The lighting is bright, suggesting a sunny day.

Reference native plant community
dominated by dense *Scirpus microcarpus*

Dog

Topsoil and peat

<-1,200 years b.p. ash layer

Forest soil layer

Sand, silt, and organic layers

8,960 years b.p. pine stump ->

Paleo-soil

Shovel

10,000 years of deposition

East Meadow
Aspen Valley
Yosemite
S.H. Wood 1975

Sugarloaf Meadow, Kings Cyn. NP



Cattle grazing in Sequoia-Kings Canyon National Park, 1941



Upper Paradise Meadow, Kings Cyn. NP



Sugarloaf Meadow, Kings Cyn. NP

Cattle grazing in Sequoia-Kings Canyon National Park, 1941

Halstead Meadow, Sequoia NP



Gully present during
1929 pre-road survey

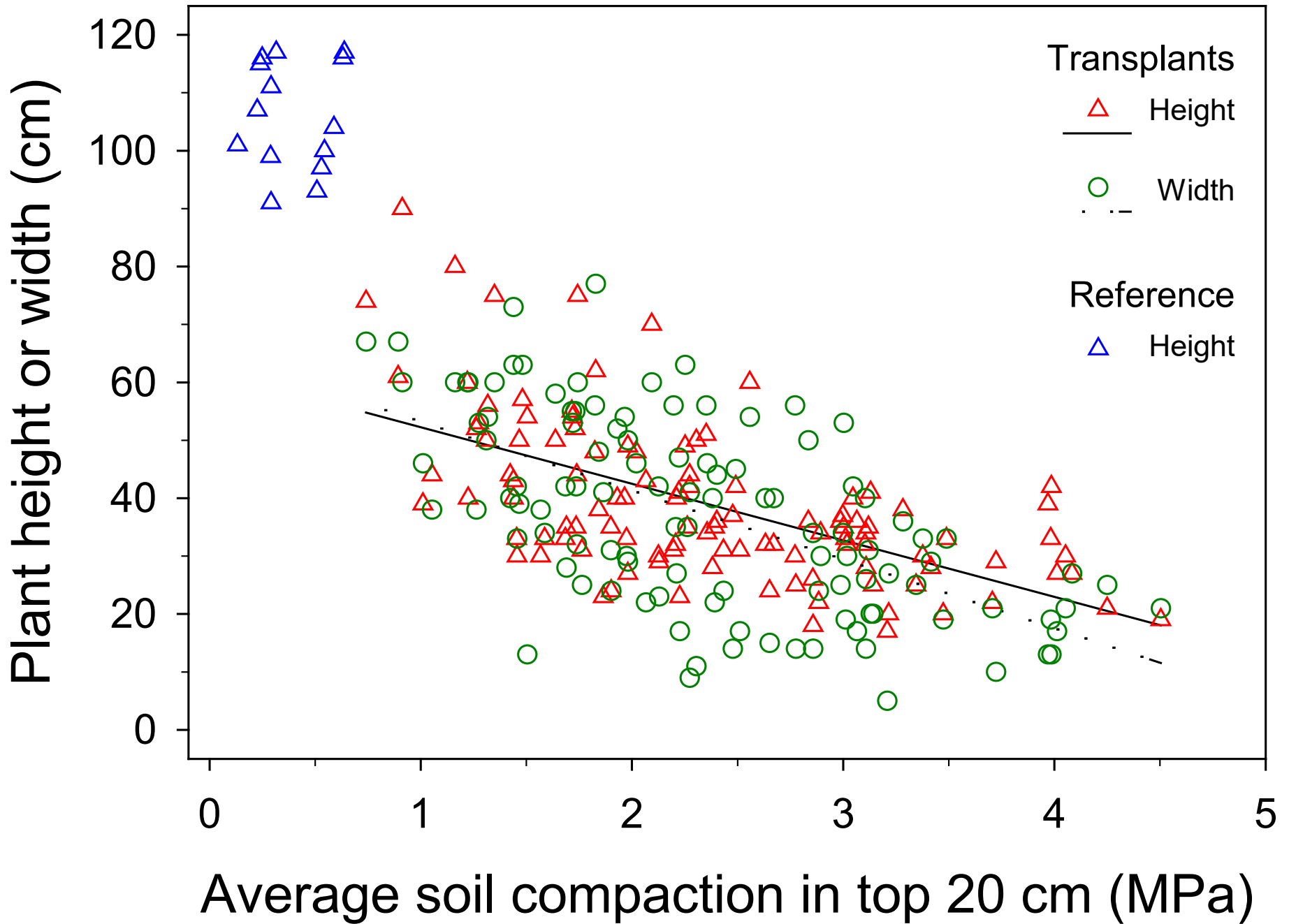
Jun 2011





Jul 2012

Restored geomorphology and soil processes
Added wood chips to reduce compaction

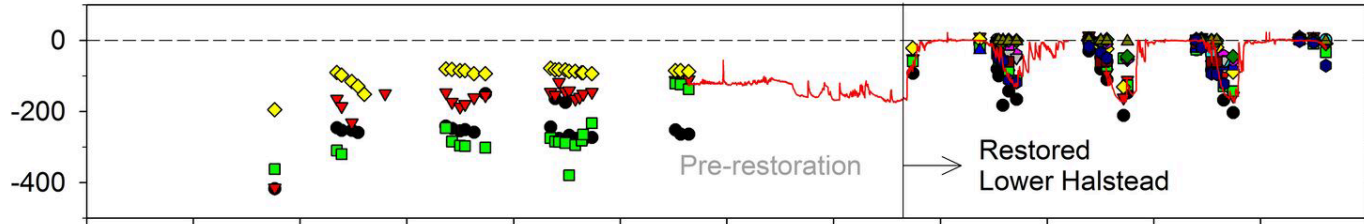
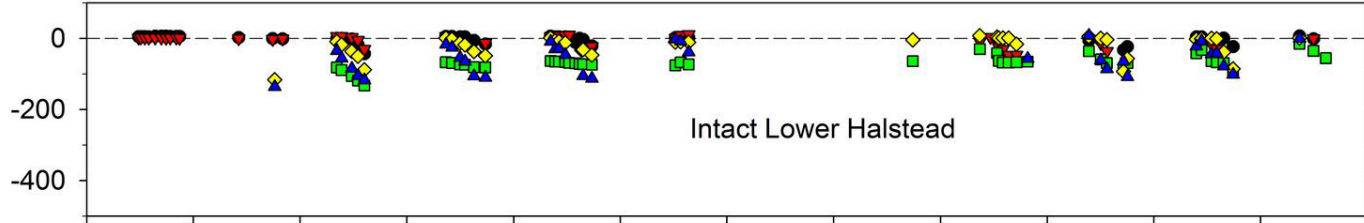
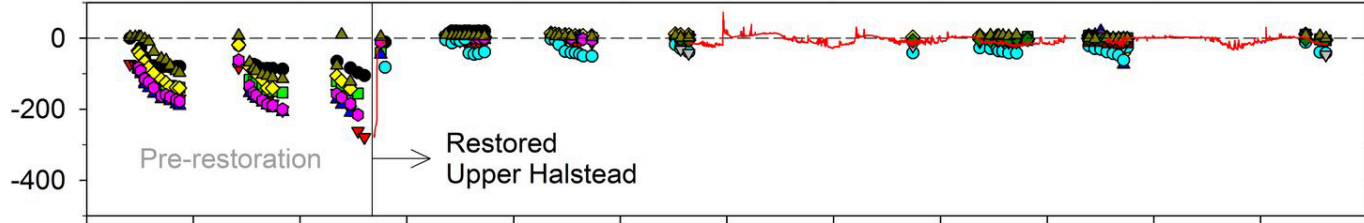
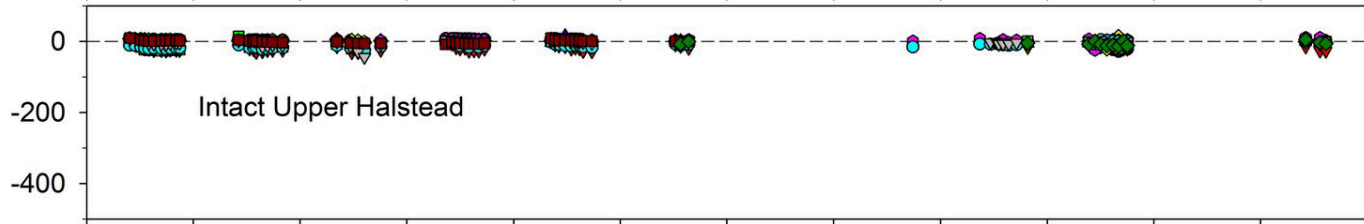
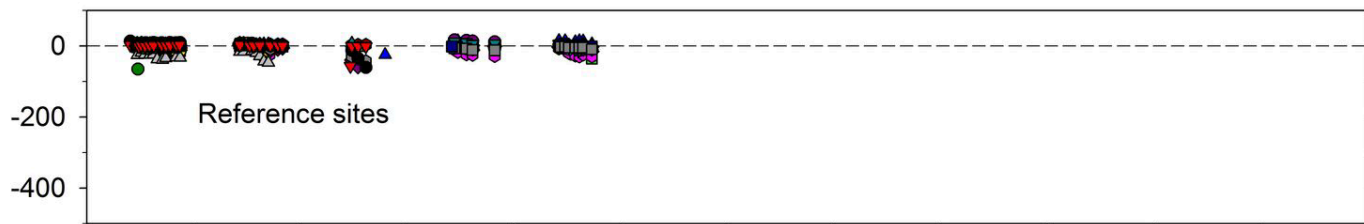




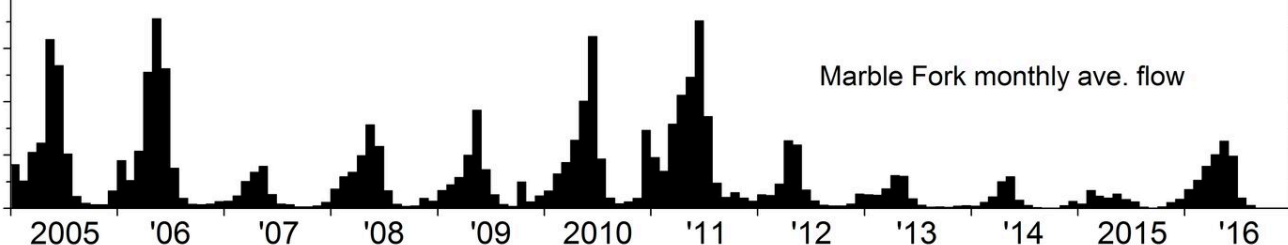
Apr 2013

By restoring geomorphology
we restored hydrology

Water level relative to ground surface (cm)



Discharge
($\times 10^3$ L/s)



Jun 2013

Planted native *Scirpus microcarpus*





Jul 2013



Jul 2014

Aug 2016





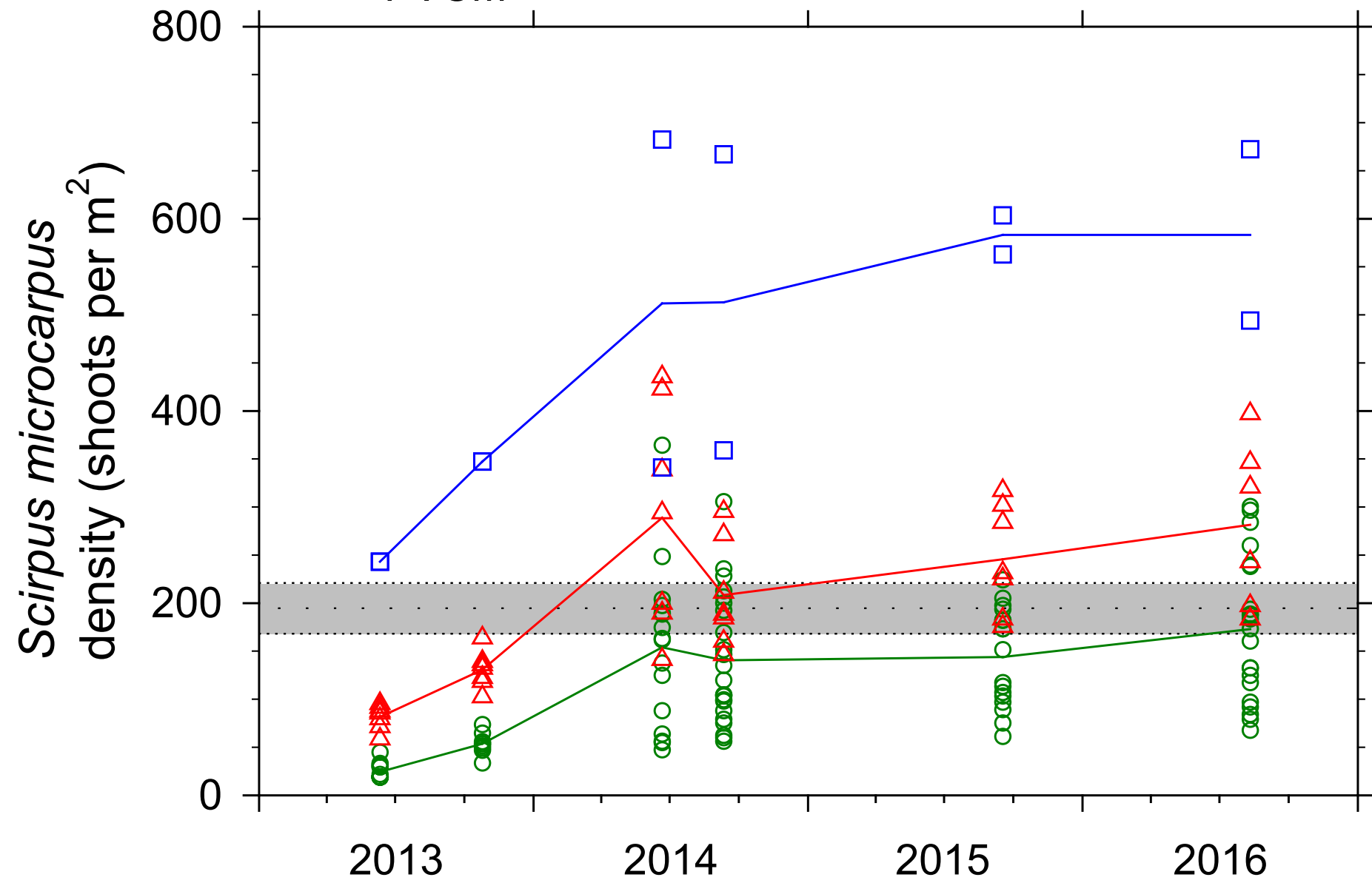






- Low density plugs
- △ High density plugs
- PVCCM

Reference plots
(mean \pm 2SE)







June 2021
8 years post-planting

Oct 2021



Aug 2022











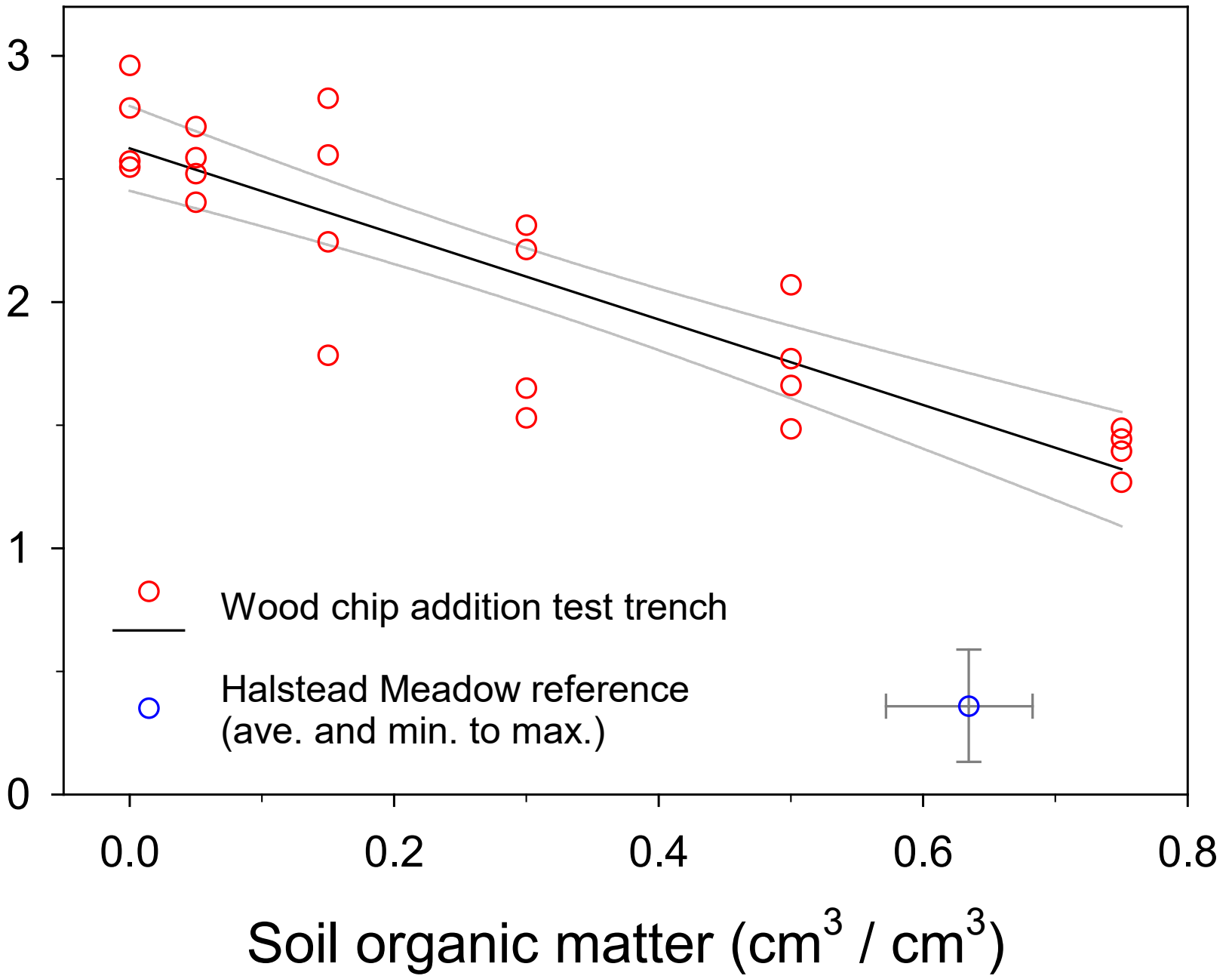


Thank you

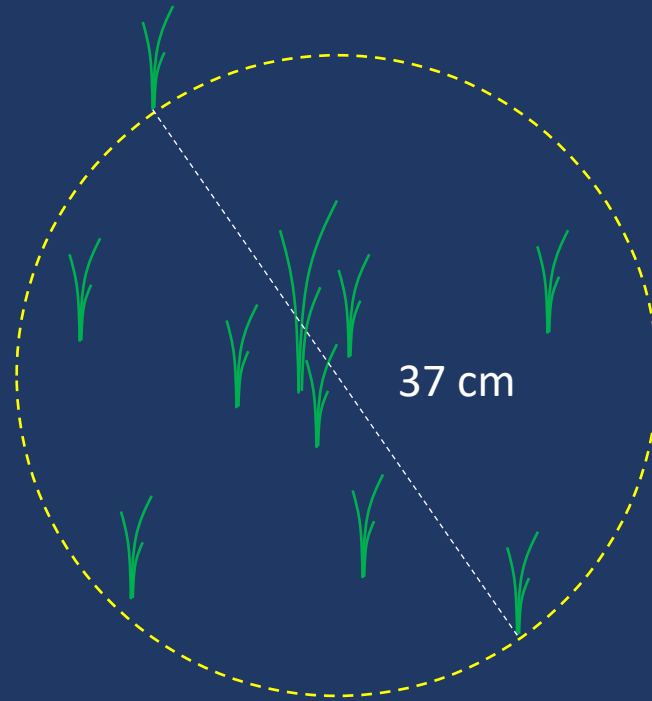




Average soil compaction
in top 20 cm (MPa)



Average plant spread in compacted gully fill



Predicted plant spread if gully fill had natural level of OM (64% OM by vol)

