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Natural Resources Conservation Service

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Soil Health Project
2/20/2017



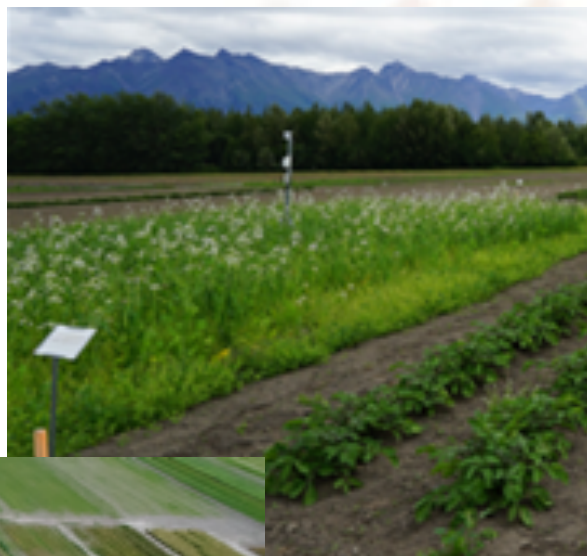
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Soil Health Project



4 replications

12 treatments each

2, 4, & 6 species cover mix oat. Pea buckwheat, tillage radish annual rye, alfalfa

1, 2 and 3 year rotations between potato

Timothy & alfalfa hay rotation

Conventionally tilled control

Monitor physical, chemical and biological aspects of the soil



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Bulk Density



Bulk density improved from 1.7 to 1.2

Improvement of Structure

Increased organic matter



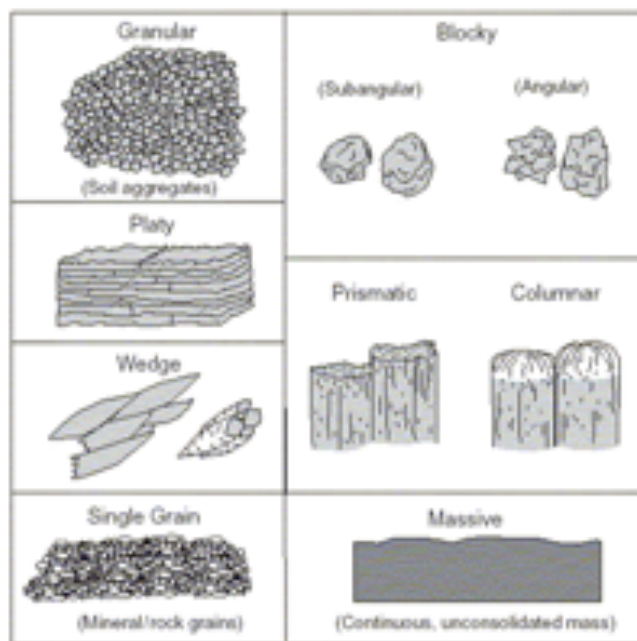
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Soil Structure



Natural aggregation

Pore space

Flocculation

Chemical precipitates
oxides
carbonates
silicates

Biological activity
biofilms
fungal hyphae

Ionic bonding



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Soil Structure



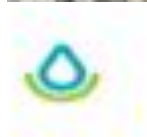
soil structure will decline under most forms of cultivation

Left Platy structure excess tillage and wheel traffic

Middle some improvement blocky structure

Right considerable improvement granular structure

Most improvement in the timothy alfalfa plots



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Aggregate Stability



ability of soil aggregates to resist degradation when exposed to tillage, water and wind erosion, rapid wetting

pore size distribution

air and water retention and movement in soil



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Biological



Worm casts

Bio-tubes

Roots

Fungal hyphae



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Infiltration



orientation and packing of dispersed soil particles

Separated from soil aggregates due to the impact of rain drops

Residue greatly improves this condition



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Large rain simulator show the affect of different management systems

Left to right

Grazed pasture
4 species mix
Native forest floor
Compacted hayfield
Traditional tillage

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Questions



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