

Project: _____

State phase name: _____

State phase ID: _____ Plot replicate no: _____ Stratum: Kind _____ ID _____

Collector: _____ Date: _____

Cover, litter and O horizon (at hoop)

Special sampling instructions: If soil sample location falls on an unsuitable location, move 2 m along transect tape until a suitable location is found. Unsuitable locations include gullies, rock outcrop, manure piles, soil inclusions, etc.

NOTES:

Enter cm to nearest 0.1cm

Veg cover (canopy)		Litter* cover (%)	Pedoderm / Soil crust class	Dominant biological crust group
Over-story	Ground			

Stratum -soil replicate ID	Horizon sequence number	Horizon symbol	Horizon depth upper (cm)	Horizon depth lower (cm)	Litter* moisture status D/M/W	User Pedon ID and horizon sequence no.	Hoop diameter (cm)	Litter* depth 1 (cm)	Litter* depth 2 (cm)	Litter* depth 3 (cm)	Litter* depth 4 (cm)

*Litter refers to the O horizon, duff.

Pedoderm class (25 cm x 25 cm) (select one)

Over 25 cm x 25 cm plot

Veg. cover (canopy)

(select one)

NC = No perennial canopy

PG = Perennial grass

AG = Annual grass

F = Perennial forb or herbaceous

Sh = Shrub

T = Tree

Biological crust

functional/structural group

(select 1 or 2 dominants)

Cyan = Cyanobacteria

LC = Lichen

M = Moss

LV = Liverworts

- S** = Soil; pedoderm is characterized by bare mineral soil and none of the classes below
- WP** = Weak physical or biological crust; can be disrupted by rainfall, none to few cyanobacterial sheaths dangling from ped, no darkening from cyanobacteria
- SP** = Strong physical crust, usually platy or massive (structure not disrupted by rainfall), no substantial biological component
- VC** = Vesicular crust; a layer of many unconnected spherical or ovoid pores; at the soil surface
- CEM** = Cemented pan exposed at surface
- SC** = Salt crust of fine to extremely coarse evaporite crystals or visible whitening on the soil surface; may include biological components
- PDB** = Poorly developed biological crust assemblage, many cyanobacterial sheaths, may be slightly dark, can include other functional/structural groups (algae, lichen, moss)
- SDB** = Strongly developed biological crust assemblage, obvious dark cyanobacteria, rubbery algal, moss or lichen crust
- CB** = Cracking or curling, rubbery algal crusts, with or without lichen
- EP** = Erosion pavement; a concentration of rock fragments at the soil surface caused by erosion and removal of finer soil material; individual fragments may be displaced during runoff events
- DP** = Desert pavement; a concentration of closely packed and polished rock fragments at the soil surface, embedded in a vesicular crust
- D** = Duff (partially & fully decomposed plant & organic matter; above the A horizon)
- SA** = Well-formed or distinct structural aggregates at the soil surface and no other class above (well aggregated, stable soils)

Bulk density (core)

Enter cm to nearest 0.1 cm

Stratum-soil replicate ID	Horizon sequence no.	Horizon symbol	Horizon depth upper (cm)	Depth lower (cm)	Soil moisture status D/M/W	User pedon ID and horizon sequence no.	Ring diameter (cm)	Total ring length (cm)	Ring ht 1 (cm)	Ring ht 2 (cm)	Ring ht 3 (cm)	Ring ht 4 (cm)

Penetration resistance

Depth (cm)	Soil moisture status D/M/W	Penetrometer tip Rod or Foot ?	Type of spring	Reading 1	Reading 2	Reading 3	Reading 4
Surface							
2							
5							
8							
11							
14							
17							
20							
23							
26							
29							

Penetrometer tip
(diameter)

Rod, flat end (6.4mm)

Foot (25mm)

Spring type

(in order of increasing strength)

L= Lee

O= Original

J1= Jones 11

J3= Jones 323

INSTRUCTIONS: Soil Sample Location for RANGE

11/20/2008

(Complete only appropriate items for other land uses)

Follow this sequence at each soil sample location:

Soil sample location

1. Go to flag marking a soil sample location (the stratum-soil replicate). Flags are placed during plot layout, see Plot Master_RANGE.
2. Record project, plot, and sample ID, and data on forms: Soil Sample, Db(core), Penetration Resistance, Pedoderm_RANGE and Soil Aggregate Stability Test(field)_RANGE.
3. Identify a 25 cm x 25 cm plot adjacent to the transect tape and the flag as in diagram below. Always place soil plots on one side of tape and herbaceous subplots on the other side of the tape.

Cover

4. Assign codes for vegetative and soil surface cover and pedoderm/soil crust class to the 25 cm x 25 cm plot.
5. Carefully remove all plants, but not the O horizon. Clip as close to the soil surface as possible. Do not disturb roots or soil surface.

Litter and O horizon sample

6. Place a standard size hoop over the 25 cm x 25 cm plot. Estimate litter/O horizon/duff cover (%) and make 4 measurements of depth (to nearest 0.1 cm) along the perimeter of the hoop. Discard surface wood > 6 mm (1/4 in) diameter and live above-ground plant material. Collect remaining surface wood, litter, O horizon and all roots and place in paper or cloth bag. Sample Oi, Oe, Oa horizons and current-year litter separately if necessary.

Penetration resistance and soil stability

7. Place bulk density ring over area where sample will be collected (for protection), but do not insert.
8. Randomly select points for 4 penetration readings of the soil surface and 3 soil stability samples. Measure

and collect these pedoderm properties before the surface is disturbed for soil sample collection.

9. Excavate a small hole about 40 cm wide and 50 cm deep adjacent to the bulk density ring.
10. Place a 30 cm ruler against the pit face; secure with golf tees. The top of the ruler should be flush with the top of the O horizon. Collect 4 penetration resistance readings from the pit face, starting at 2 cm, and at each depth listed on the form *before the soil dries*.

Description

11. Describe the soil profile, including O horizon, to the bottom of the whole. If a horizon is greater than 25 cm thick, subdivide, describe, and sample as two layers. Subdivide based on morphology, if present, or at the midpoint. Note any horizons that need special analysis.

Bulk density and mineral soil samples

12. Record stratum soil replicate ID, horizon sequence number, symbol and depth to be sampled on this form. Base of final sample should be exactly _____ cm below the mineral surface. Use 40 cm for most projects.
13. Starting at the mineral soil surface, insert bulk density ring to 2 cm (or the base of the A if less than 5 cm thick). Make 4 measurements (nearest 0.1 cm) of ring height above soil sample; measure *on the outside of the ring*. Insert spackle blade directly under the ring and carefully remove soil core. *Do not disturb the soil below*. Place in sealed bag as soon as sampled for field moist weights (Oven dry weights will be measured in the laboratory.)
14. Collect a 1500 g **sample of each layer**, essentially as a slice from top to bottom of the horizon or layer. Mix and split for analysis, if needed, as follows:

- a. _____ g for _____
- b. _____ g for _____
- c. _____ g for _____
- d. _____ g for _____

15. Repeat 13 and 14 for the remainder of the surface horizon (from 2 cm to the upper boundary of the next horizon). Handle each layer sampled as a separate horizon and number consecutively.
16. Repeat 13 and 14 for the remaining horizons or layers. Handle each layer sampled as a separate horizon and number consecutively. Base of last sample should be exactly _____ cm below the mineral soil surface.

