

DATA COLLECTION PROTOCOL: SOIL SAMPLE

Field Guide

Purpose

The purpose of this protocol is to document standardized steps in obtaining soil samples for semi-arid sagebrush steppe ecosystems. This documented protocol seeks to ensure accuracy and consistency across all rangeland research projects conducted at the Idaho State University GIS Training and Research Center. This protocol includes methods for measuring soil pH and sampling for total nitrogen and organic carbon content.

Equipment

- Bags to weigh/store soil – durable plastic (freezer grade zip-loc) bags with a reliable seal and labeling area
- GPS receiver
 - Trimble – used to navigate to random sample points, collect the sample point location, and enter field data. A Trimble GeoXH is preferred (or other receiver capable of 0.10m accuracy (@95% CI)).
- Hand Auger-The size of the auger needs to be sufficient enough to obtain a sample 10 cm in depth.
- soil pH tester-Kel Instruments, Kelway soil tester (w/ designated plate cleaning sheets)
- clean cloths/paper towels to properly clean pH tester
- De-ionized (preferred) or distilled water (acceptable)
- Marker – Permanent (Sharpie) marker to label plastic bags
- Pesola scale with heavy duty clips– This scale must be able to weigh soil sample of 100-300.
- Measuring tape (optional) – use to check sample depth.

In the Field

Part 1: Picking the right site location

Due to the nature of the area or the specific study, pre-determined random samples locations will be used. Sample locations should be within a relatively homogeneous location to ensure that the soil sample is an accurate representation of the study site. Sample sites must be at least 30 m from any edge effect features (i.e. roads, trails, fence lines) which may affect the validity of the sample.

Part 2: Data collection

**Note: It is assumed that collection teams will consist of two people and one Trimble GPS receiver. If only one person is performing sample collection, the order presented is recommended but not necessary. If a third person is present, items needing assistance can be assigned. This protocol, as described, likely cannot accommodate more than three people.*

Sample Location

1. Navigate as close as possible to the pre-defined sample site.
2. Once the site sample site has been located, sampling can begin.

Point data collection

3. Determine a plot center. Begin recording the point's location using ArcPad on the Trimble GeoXH (the soil sampling field form should pop up as a point is added to the selected location).

Soil Sample Collection

4. Zero the Pesola scale using an empty plastic bag of the appropriate size for the sample site.
5. Remove all vegetation, litter, and duff from the region where the soil sample will be taken.
6. Using the hand auger remove a soil sample from the top 10 cm of the soil horizon. Retain a soil sample that is at least 120g in weight and free of litter and roots.
 - a. Soil from the hand auger should be carefully added to a plastic bag (excessive amounts of roots and other organic material should be carefully removed by hand before weighing the sample).
 - b. If the sample is greater than 150 g., homogenize the sample and carefully remove small amounts until the desired weight is achieved.
7. All personnel should help finish bagging and weighing the soil samples as necessary.
8. Using the field form on the Trimble GPS receiver enter the soil sample weight. Using a permanent marker, label the sample bag with the appropriate site ID, sample ID, date, and weight (g.). Transfer the material into a second Ziploc bag. Within the second Ziploc bag, place a pre-printed label including the point ID (optional).

Soil pH measurement

9. Obtain a soil pH reading from the same location of the soil sample.
 - a. Homogenize the loose soil in the void space created from soil sampling with the hand auger.
 - b. Submerge the soil tester into the soil so that the metal plates around the housing are covered.
 - i. If the soil pH meter does not immediately spike well above seven, this indicates insufficient soil moisture to generate an accurate reading.
 - ii. Carefully add (and mix) deionized water to the soil until the pH meter spikes upon insertion.
 - c. Allow the pH meter approximately one minute to stabilize and achieve a correct reading.
 - d. Record the soil pH to the nearest 0.2 graduation using the digital field form on the GPS.
10. Gather all field equipment and store appropriately in backpack(s).

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