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Agriculture

Natural
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Conservation
Service

National
Soil Survey
Center

Kellogg
Soil Survey
Laboratory

Soil Sample Submission Protocol for the Kellogg Soil Survey Laboratory (KSSL)

November 2016

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Cover Photo

Soil description and sampling. Photo courtesy of John A. Kelley, USDA–NRCS.

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PART 1: Conventions Regarding Documentation and Sample Labeling

All soil sample shipments to the KSSL must be accompanied by hard copies of "KSSL Project Sheet.xlxs" and "KSSL Sample Submission Sheet.xlsm" found at http://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcs142p2_052597&ext=zip. At time of shipment, these files must also be emailed to Scarlett Bailey (scarlett.bailey@lin.usda.gov). The KSSL must receive the sample submission spreadsheets and profile descriptions before sample processing can begin.

One spreadsheet created from "KSSL Project Sheet.xlxs" must be submitted for each *project*, and one spreadsheet created from "KSSL Sample Submission Sheet.xlsm" must be submitted for each *pedon*. Naming conventions for the spreadsheets are described below. Please note that the "KSSL Sample Submission Sheet.xlsm" includes two worksheets: 1) "KSSL Pedon Field Sheet" and 2) "Requests for Analyses." Imbedded explanations are displayed by hovering your mouse over the red triangles. Layer data entered into the "KSSL Pedon Field Sheet" will auto-populate the same fields in the "Requests for Analysis" sheet.

NASIS pedon descriptions and site information must be submitted with the samples. Run the NASIS report (from NSSC Pangea): "PEDON – Pedon description (metric)," print the output, and include it with the samples. The personnel who do sample processing at KSSL require this information to log in the samples. Edits and updates to the site and pedon information that is associated and displayed with sampled pedons will be managed through NASIS (formerly done through the "SOI-8" process). Site and pedon information in NASIS will be linked with the corresponding information in the KSSL Laboratory Information Management System (LIMS). Regional Offices will have control of those sites and pedons and can edit them in NASIS as needed. Refer to part 3 of this document, "NASIS Procedures for Sample Submission and Pedon and Site Information," for detailed instructions.

Summary of Documentation Requirements for Submitting Samples

1. For each overall soil survey project, a copy of "KSSL Project Sheet.xlsx" must be named and saved using the project Regional Office number and date in the following format: RO##_MM_DD_YY, e.g., RO12_02_29_14.
2. For each pedon, a copy of "KSSL Sample Submission Sheet.xlsm" must be named and saved with the User Pedon ID. Refer to User Pedon ID naming convention below.
3. Print hard copies of the
   a. "KSSL Project Sheet,"
   b. "KSSL Pedon Field Sheet" worksheet,

      Note: In the Sampling/Notes section of the "KSSL Pedon Field Sheet," include the project objective and the preferred deadline to receive data.
   c. "Requests for Analysis" worksheet, and

d. NSSC Pangaea report, “PEDON – Pedon Description (metric).”

   Note: Pedon descriptions must be included with the corresponding packaged soil samples to be shipped (see PART 3).

4. Electronic copies of the spreadsheet files created from “KSSL Project Sheet.xlsx” and “KSSL Sample Submission Sheet.xlsm” must be emailed to Scarlett Bailey and your Regional Liaison at time of shipment. If you are not sure who your current Regional Liaison is, contact Linda Kruger (Linda.Kruger@lin.usda.gov).

Conventions for User Pedon ID and User Site ID

When completing the “KSSL Sample Submission Sheet” and when labeling samples, observe the NRCS conventions for “User Pedon ID.” The “User Pedon ID” is the same as “User Site ID” when only one pedon is sampled at a site (adapted from *Field Book for Describing and Sampling Soils v. 3.0*). If more than one pedon is sampled at a site, a one-character suffix is added to Pedon ID.

Example User Site ID: S2004WA027009

- S = Indicates a sampled pedon.
- 2004 = Calendar year pedon was sampled. Use a four digit format.
- WA = Two-character (alphabetic) Federal Information Processing Standards (FIPS) code for State where pedon was sampled. For foreign samples, use the Country Code.
- 027 = Three-digit (numeric) FIPS code for county where sampled. It is important that this be the actual county where the samples are taken to ensure compliance with APHIS regulations. For non-U.S. samples, use the appropriate three digit world-wide geographical location code.
- 009 = Three-digit, consecutive pedon number for calendar year for county. Use 0 as place holder as necessary.
- For multiple pedons taken from the same site, a one-character suffix must be used to distinguish the Pedon IDs, e.g. S2004WA027009*A*, S2004WA027009*B*, S2004WA027009*C*. The User Site ID is always the same: S2004WA027009 (User Pedon ID minus the last character).
- To be consistent with NASIS format, never use spaces, dashes, or hyphens. Use uppercase letters only.

PART 2: NSSC Policy for Labeling, Packaging, and Shipping Soil Samples to the Kellogg Soil Survey Laboratory

Definitions

- Regulated soil sample.—A regulated soil sample is one that was collected within an area quarantined by the Animal and Plant Health Inspection Service (APHIS), the Nebraska Department of Agriculture (NDA), or both.
- Unregulated soil sample.—An unregulated soil sample is one that was collected from an area that is not quarantined by either APHIS or NDA.

General Considerations

1. Do not package or ship soil samples from areas listed below. The list is current as of 8/1/2016. Check our website (http://go.usa.gov/38dUx) for the latest update of this document. Contact Richard Ferguson (Rich.Ferguson@lin.usda.gov) in writing (via email) for special instructions. A verbal exchange by telephone is not considered sufficient documentation.

   a. California:
      i. Los Angeles County
      ii. Orange County
      iii. Riverside County
      iv. San Diego County

   b. Florida
      i. Broward County
      ii. Miami-Dade County

   c. Hawaii:
      i. Entire State

   d. Idaho:
      i. Bingham County
      ii. Bonneville County

   e. Texas:
      i. Cameron County
      ii. Hidalgo County
      iii. Webb County
      iv. Willacy County
      v. Zapata County

   f. U.S. territories (e.g. Puerto Rico, Guam)

   g. Any foreign country

2. To package and ship soil samples from *all other areas* of the U.S., follow the provided instructions exactly. These procedures are required by APHIS or NDA. If you have questions about the instructions, contact Amber Shinn (amber.shinn@lin.usda.gov) *in writing* (via email) before packaging or shipping the soil samples.
3. Except for the packaging tape and packing material, the KSSL will furnish all packaging supplies, which must be used. To request packaging supplies, contact Amber Shinn.

4. The KSSL will arrange all soil sample shipments. You must always have prior project-specific written approval from Amber Shinn before shipping samples to the KSSL. Do not ship or transport soil samples to the KSSL without this prior project-specific written authorization. APHIS can demand that unauthorized samples be destroyed.

Labeling, Packaging, and Shipping Bulk Samples

5. The primary container for each bulk sample must be the plastic bulk sample bag furnished by the KSSL. A bulk sample bag must not be filled beyond 2/3 full.
6. Use an indelible marker to label the tag and sample bag.
7. Fill-out the sample tag, which must include the following elements:
   a. Soil series name or equivalent, e.g., SND (series not designated),
   b. Horizon designation,
   c. The User Pedon ID followed by "-1", "-2", "-3" etc. to indicate the layer number within the pedon ("1" being the top layer),
   d. Layer top and bottom depths, and
   e. Consecutive field layer number. See figure 1.
   The consecutive field layer number is a running total of all the layers within a sample submission or project. Which means if you are submitting to the KSSL 4 pedons, each with 7 layers, then the field layer numbers should run from 1-28.

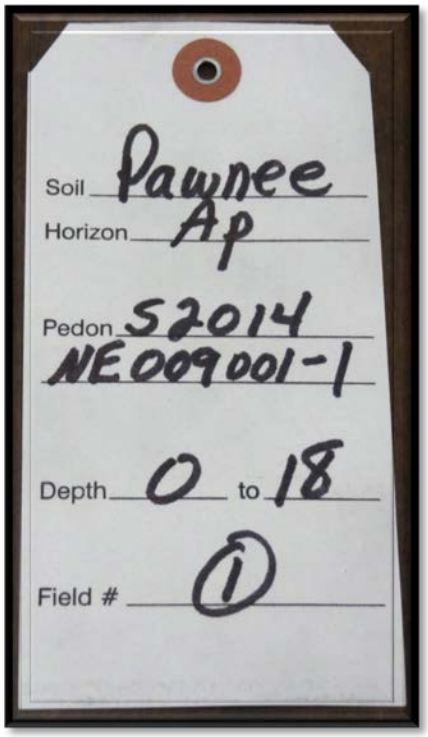


Figure 1.—A correctly labeled sample tag for bulk samples. (Step 7)

8. Label the <u>bottom half</u> of the sample bag with the same information as the tag (step 7 a-e). See figure 2.

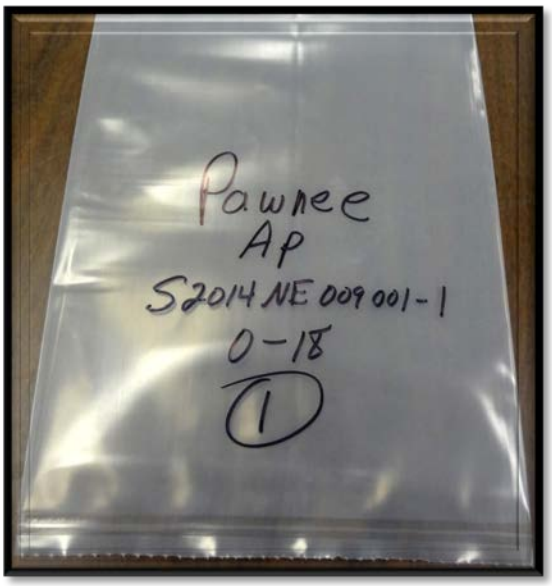


Figure 2.—A correctly labeled sample bag for bulk samples. (Step 8)

9. Fold top 2 inches of the sample bag <u>away</u> from the information on the bag. Fold the top 1 inch of the 1st fold backwards <u>towards</u> the information on the bag. Insert the top of the tag into the center of the second fold, with the tag information facing <u>outward</u>. Using a heavy duty stapler (not a desk stapler), staple the tag between the two folds. The information from both the tag and bag should be easily readable on the <u>same</u> side of the bag. Next staple the left and right sides of the double fold. Verify that information on sample bags and tags is in agreement. See figure 3.

Figure 3.—Correctly folded and stapled bulk sample bag and tag. (Step 9)

10. Place multiple sample bags in a secondary, 18" x 36" plastic bag furnished by the KSSL. Do not fill the secondary plastic bag beyond 3/4 full. Never fill a secondary bag to a weight of more than 70 pounds.

11. Seal the secondary plastic bag by double folding and stapling. See figure 4.

Figure 4.—Correctly folded and stapled secondary plastic bag for bulk samples. (Step 11)

12. Place a single secondary plastic bag in an 18" x 18" x 12" cardboard box furnished by the KSSL. One full secondary plastic bag should fit inside a box. See figure 5.

Figure 5.—A single secondary plastic bag in an 18" x 18" x 12" cardboard box furnished by the KSSL for bulk samples. (Step 12)

13. Add packing material (such as crumpled paper or bubble wrap) to completely fill voids and minimize shifting. See figure 6.

Figure 6.—Packing material used to stabilize the bulk sample in the cardboard box. (Step 13)

14. The following hard copies must be included in the box on top the packing material:
    a. "KSSL Project Sheet,"
    b. "KSSL Pedon Field Sheet" worksheet for each pedon,
    c. "Requests for Analyses" worksheet for each pedon, and
    d. Pedon descriptions printed from NASIS for each pedon.

15. Be sure to use only high-quality packing tape and securely close the box. See figure 7.

Figure 7.—High-quality packing tape used to securely close the bulk sample box. (Step 15)

16. Notify Amber Shinn of the weights of the boxes in order to arrange for shipping to the KSSL. Do not ship boxes in any other manner.

Labeling, Packaging, and Shipping Clod Samples

17. Clod samples and natural fabric samples shipped to the KSSL must be placed in “clod boxes” furnished by the KSSL. Clod samples, which are used for bulk density, must be in a separate box from natural fabric samples, which are used for thin sections and storage.

18. Use an indelible marker to label the clod sample boxes.

19. Label the outside cover of the clod sample box with the following elements:
    a. Sample type (clod or natural fabric; a natural fabric sample is an oriented clod) and
    b. User Pedon ID. See figure 8.

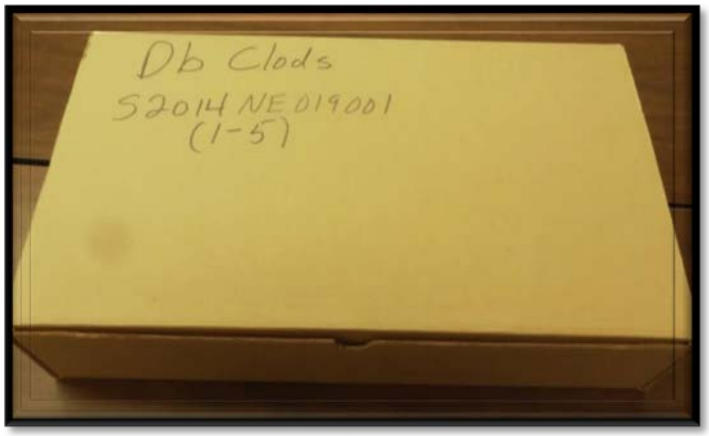


Figure 8.—A clod sample box on which the outside cover has been correctly labeled. (Step 19)

20. On the inside of the clod box lid, and for each box cell, write:
    a. The horizon designation.
    b. Layer top/bottom depths from which the clod was collected. Ordinarily, three fist-sized clods are collected per layer for bulk density.
    c. Sequence field number. (Also, write the sequence field number on each bag.) See figure 9.

Figure 9.—The inside of a correctly labeled clod box. Each cell is labeled. (Step 20)

21. The primary container for each clod or natural fabric sample must be a plastic clod-sample bag furnished by the KSSL.
22. Seal each clod bag with a twist tie. See figure 10.

Figure 10.—Clod bags that have been correctly sealed with a twist tie. (Step 22)

23. Place clod bags in the cells of a clod box.
24. Fill empty cells in the clod box with packing material (such as crumpled paper or bubble wrap) to increase stability. See figure 11.

Figure 11.—A clod box in which the empty cells have been filled with packing material to increase stability. (Step 24)

25. Place each clod box in its own plastic clod-box bag furnished by the KSSL.

26. Knot each clod bag closed. See figure 12.

Figure 12.—A clod box in its own plastic clod-box bag. The bag is tied shut. (Step 26)

27. Place the clod boxes in a clod trunk provided by the KSSL. Because the clod trunk is designed to hold six clod boxes, use empty clod boxes (instead of packing material) to fill any void space left by less than six filled clod boxes. Filled clod boxes must always be placed at the bottom of the trunk. See figure 13.

Figure 13.—Clod boxes in a clod trunk, which is furnished by the KSSL. (Step 27)

28. The following printouts must be included in the trunk on top of the corresponding clod boxes being shipped:
    a. "KSSL Project Sheet,"
    b. "KSSL Pedon Field Sheet" worksheet,
    c. "Requests for Analysis" worksheet, and
    d. The pedon descriptions printed from NASIS.

29. Notify Amber Shinn of the trunk weights to arrange for shipping to the KSSL. Do not ship trunks in any other manner.

PART 3: NASIS Procedures for Sample Submission and Pedon and Site Information

Pedon descriptions must be entered into NASIS <u>before</u> samples are submitted to the KSSL. The processing and analysis of samples will begin only <u>after</u> the NASIS data is transferred to the Kellogg Laboratory Information Management System. Note: Please refer to PART 1 (above) for the mandatory conventions regarding "User Site ID" and "User Pedon ID."

Procedure in NASIS for Submitting KSSL Characterization Sites

1. The Soil Survey Office staff will enter the pedon description into NASIS and verify that the "User Site ID" and "User Pedon ID" conform to national standards. See figures 14 and 15.

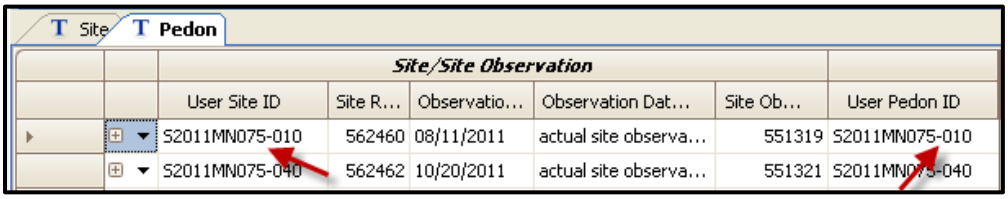


Figure 14.—A screenshot showing improper nomenclature. Such nomenclature will be changed to the proper nomenclature as shown in figure 15. (Step 1)

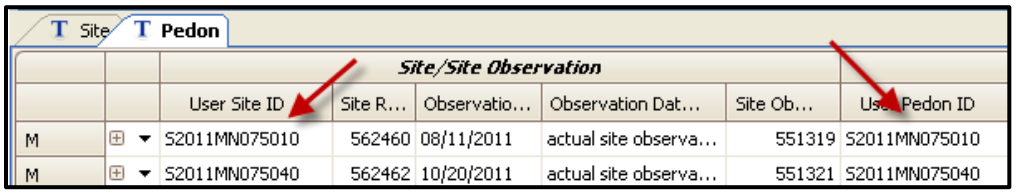


Figure 15.—A screenshot showing the proper nomenclature. (Step 1)

2. After the Site object has been fully populated, the Soil Survey Leader will change the Site ownership to the appropriate "*KSSL_Sites_MO_**" group. The membership in these groups is limited to SDQS's and others authorized to edit site information. These groups allow for Quality Assurance editing by SDQS's for correlation updates to the sampled site data. See figure 16.

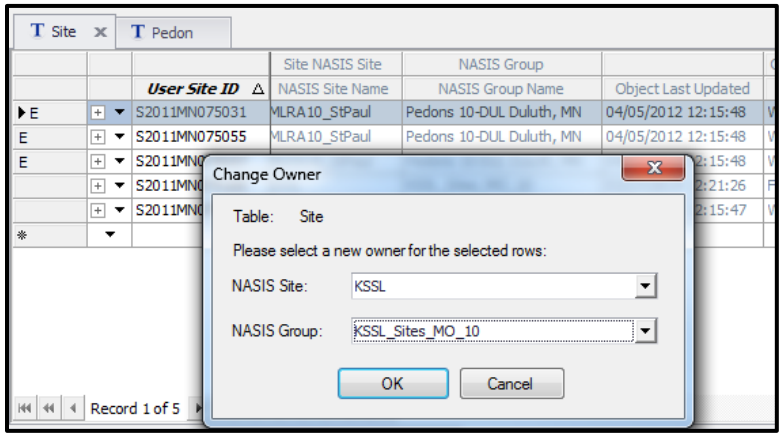


Figure 16.—A screenshot showing the how to change Site ownership. (Step 2)

3. After the Pedon object is completely populated, the Soil Survey Leader will print out a copy of the pedon description for submission with the soil samples. The Soil Survey Leader will then reassign the pedon to the KSSL_edit group and notify their liaison that the pedon is available for the addition of the laboratory sample numbers by the laboratory. See figure 17.

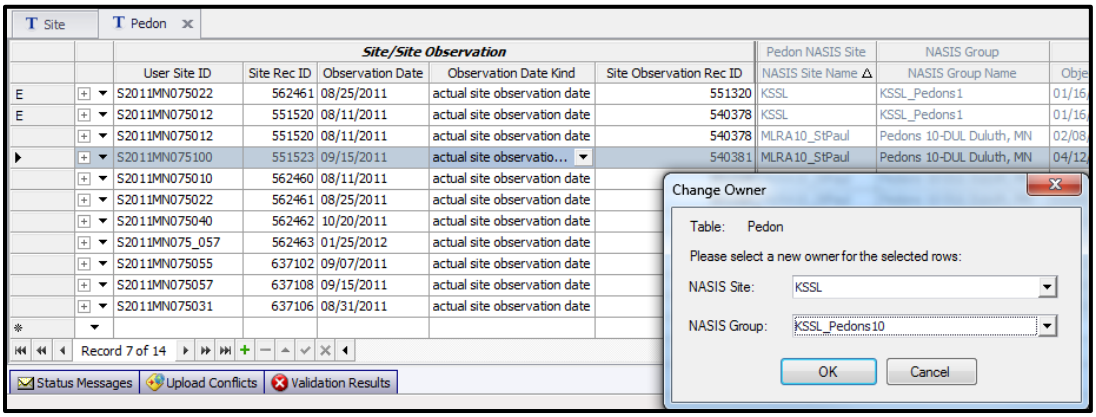


Figure 17.—A screenshot showing the how to change Pedon ownership. (Step 3)

4. After the sample numbers have been added, the field personnel may make a copy of each pedon (using Copy Trees) and change ownership of the new pedon to their own group in case of future updates to the classification. See figure 18.

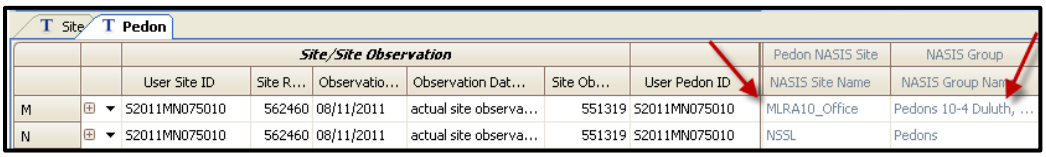


Figure 18.—A screenshot showing copied pedons. (Step 4)

This process maintains the "sampled as" pedon for the KSSL archive purposes and allows the field personnel to maintain an updated copy of the pedon to capture future correlation decisions by the Regional Office or Soil Survey Office. See figure 19.

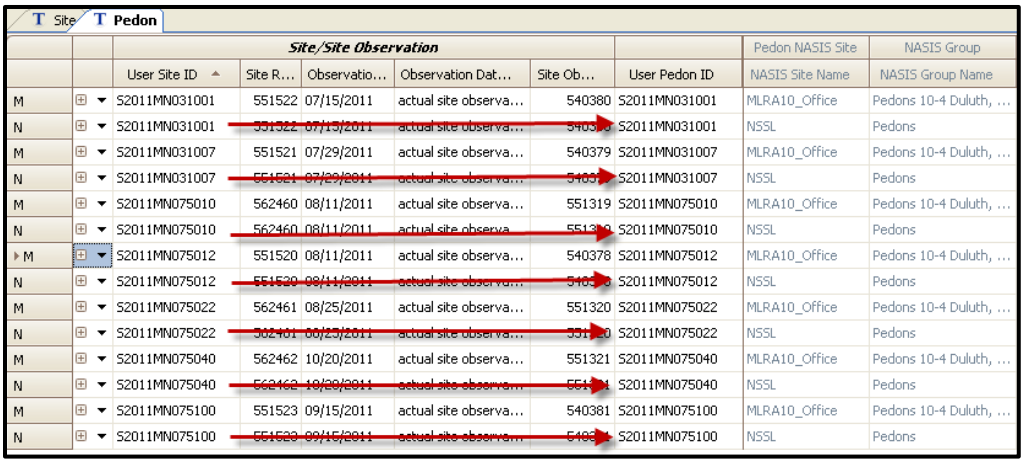
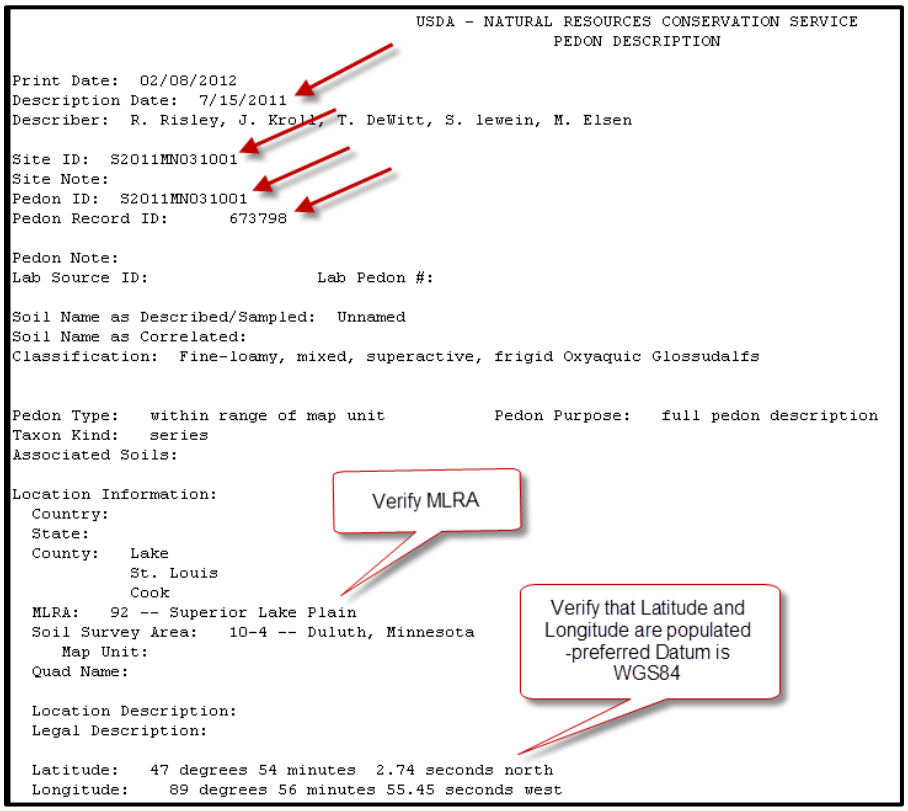


Figure 19.—A screenshot showing multiple copies of pedons. (Step 4)

Notice that each copy of a Pedon in figure 19 is linked to an individual Site. The Site will have one owner, but the pedons are owned by two different NASIS Sites. This process allows the KSSL to preserve the original soil description and allows the regional office staff to update the pedon owned by the soil survey office.

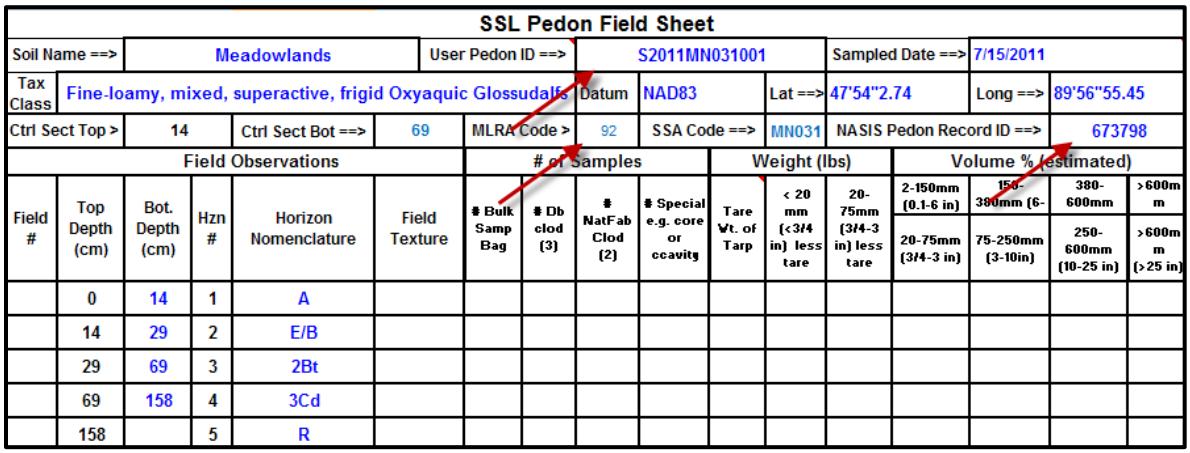
5. All samples sent to the KSSL will include a printed Pedon Description and KSSL Sample Submission Sheet. The NSSC_Pangaea report named “PEDON - Pedon Description (metric)” should be used. See figure 20. The KSSL Sample Submission Sheet will also be printed. See figure 21. Paper copies of both reports will be shipped with the samples.

   In the figures 20 and 21, the arrows identify those fields that will be transferred to the KSSL Sample Submission spreadsheet and used to populate LIMS.



```
                                   USDA - NATURAL RESOURCES CONSERVATION SERVICE
                                                PEDON DESCRIPTION

Print Date:  02/08/2012
Description Date:  7/15/2011
Describer:  R. Risley, J. Krold, T. DeWitt, S. lewein, M. Elsen

Site ID:  S2011MN031001
Site Note:
Pedon ID:  S2011MN031001
Pedon Record ID:      673798

Pedon Note:
Lab Source ID:                 Lab Pedon #:

Soil Name as Described/Sampled:  Unnamed
Soil Name as Correlated:
Classification:  Fine-loamy, mixed, superactive, frigid Oxyaquic Glossudalfs


Pedon Type:   within range of map unit          Pedon Purpose:   full pedon description
Taxon Kind:   series
Associated Soils:

Location Information:
  Country:
  State:
  County:   Lake
            St. Louis
            Cook
  MLRA:   92 -- Superior Lake Plain
  Soil Survey Area:   10-4 -- Duluth, Minnesota
     Map Unit:
  Quad Name:

  Location Description:
  Legal Description:

  Latitude:   47 degrees 54 minutes  2.74 seconds north
  Longitude:    89 degrees 56 minutes 55.45 seconds west
```


Figure 20.—A screenshot showing NSSC_Pangaea report “PEDON - Pedon Description (metric).” (Step 5)



SSL Pedon Field Sheet

Soil Name ==>	Meadowlands			User Pedon ID ==>	S2011MN031001				Sampled Date ==>	7/15/2011					
Tax Class	Fine-loamy, mixed, superactive, frigid Oxyaquic Glossudalfs					Datum	NAD83	Lat ==>	47°54"2.74		Long ==>	89°56"55.45			
Ctrl Sect Top >	14	Ctrl Sect Bot ==>	69	MLRA Code >	92	SSA Code ==>	MN031	NASIS Pedon Record ID ==>	673798						
Field Observations						# of Samples				Weight (lbs)			Volume % (estimated)		
Field #	Top Depth (cm)	Bot. Depth (cm)	Hzn #	Horizon Nomenclature	Field Texture	# Bulk Samp Bag	# Db clod (3)	# NatFab Clod (2)	# Special e.g. core or ccavity	Tare Wt. of Tarp	< 20 mm (<3/4 in) less tare	20-75mm (3/4-3 in) less tare	2-150mm (0.1-6 in)	150-380mm (6-	380-600mm	>600mm
													20-75mm (3/4-3 in)	75-250mm (3-10in)	250-600mm (10-25 in)	>600mm (>25 in)
	0	14	1	A												
	14	29	2	E/B												
	29	69	3	2Bt												
	69	158	4	3Cd												
	158		5	R												

Figure 21.—A screenshot showing the KSSL Sample Submission Sheet. (Step 5)

After the pedon descriptions are complete and the samples are prepared for shipping, place paper copies of the pedon descriptions with the samples being sent to the KSSL and send electronic copies to the NSSL liaison for the MLRA Regional Office.

Procedure for Updating Kellogg Soil Survey Laboratory Characterization Data

Steps 6 through 13 will be used for updating and maintaining KSSL data. Historically, there have been duplicate sites and pedons in NASIS—one Site/Pedon combination owned by KSSL (still referred to as NSSL in screen shots) and the other Site/Pedon combination owned by the MLRA Office (MLRAxx_Office). The following process links the copied pedons to one site. Changes that need to be made to update the Correlated Name, Classification, and Location are made to the pedon owned by the MLRA Office and the common site.

The following steps are used to combine duplicated sampled sites.

6. The SDQS will load the sites and pedons into NASIS. See figure 22.

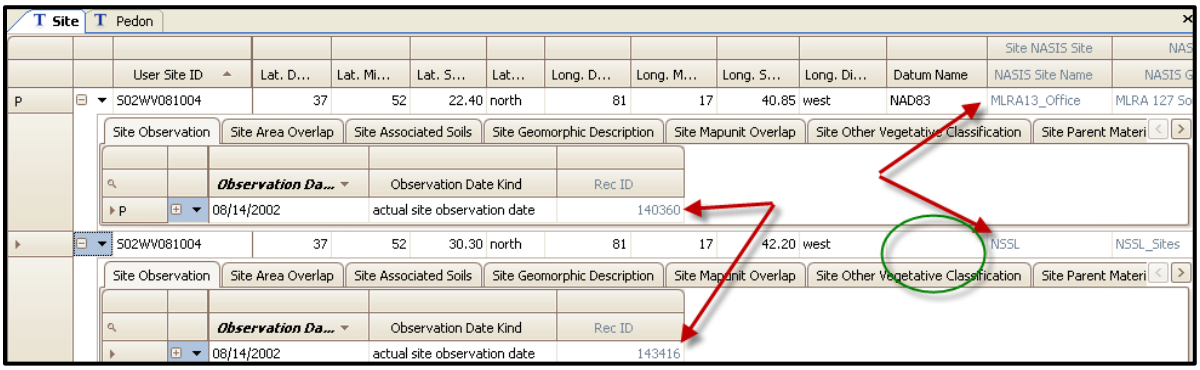


Figure 22.—A screenshot showing sites and pedons in NASIS.

7. The "Site" owned by KSSL will be the official site for all pedons associated with lab data. The SDQS will update the official site by making any necessary additions, corrections, or updates to the various data fields. In the example image above, note that the "Latitude Seconds," "Longitude Seconds," and "Datum Name" fields need to be reconciled and populated on the KSSL-owned site.

8. The MLRAxx_Office pedon will be modified and linked to the Site owned by the KSSL_Sites_MO_XX group in the NASIS KSSL Site. In figure 23 below, each pedon is linked to an individual Site: One is linked to the KSSL_Sites_MO_XX site and the other to the MLRA13_Office.

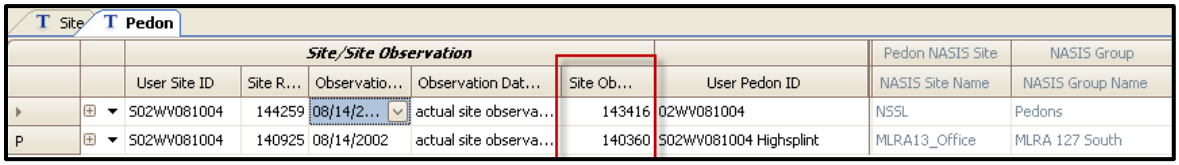


Figure 23.—A screenshot showing each pedon linked to an individual site.

9. The pedon linked to Site Observation 140360 in the figure 23 above will be edited and linked to Site Observation 143416 as shown in figure 24 below.

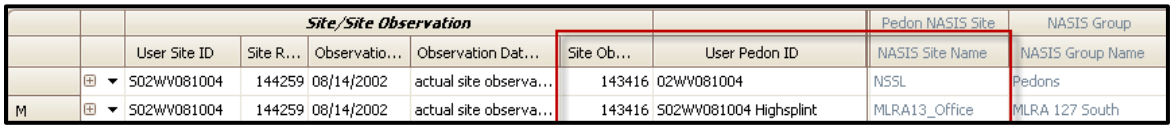


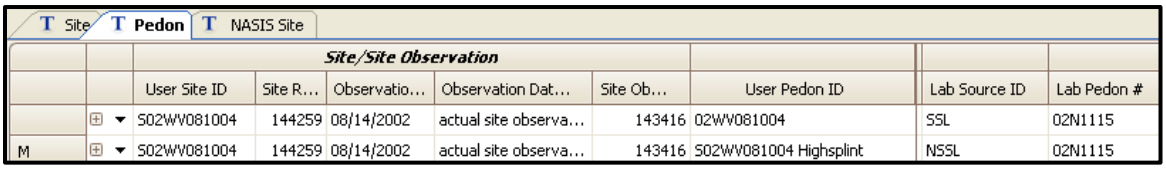
Figure 24.—A screenshot showing both pedons linked to the same Site Observation. (Step 9)

10. The site record associated with MLRAxx_Office can then be deleted after review.
    a. If other pedons are linked to the MLRAxx_Office site, the site should remain untouched.
    b. Before the MLRAxx_Office site is deleted, it should be compared to the KSSL site. Any child-table information should be updated in the KSSL Site table.

11. If the the MLRAxx_Office site has been extensively updated, and it is therefore better to make it the official site, then change the ownership of the site to the KSSL_Sites_MO_XX group. Change the ownership of the original site in the KSSL_Sites_MO_XX group to the KSSL_sites_to_delete. KSSL will link their pedon to the designated MLRAxx_Office site and delete the original KSSL site.

12. This process involving one site and two pedons will replace the SOI-8 process. It will allow the soil survey regional office to provide quality assurance and maintain the correlation history of the sampled pedons. The regional office will have the ability to maintain the site information and the pedon information.

13. This process will also allow the most current pedon description to be published with the lab data via the KSSL website. Before the MLRAxx_Office pedon can be published, the following two sets of data will need to be populated. See figures 25 and 26.
    a. The “Lab Source ID” and “Lab Pedon #” in the Pedon table.



	Site/Site Observation							
	User Site ID	Site R...	Observatio...	Observation Dat...	Site Ob...	User Pedon ID	Lab Source ID	Lab Pedon #
	S02WV081004	144259	08/14/2002	actual site observa...	143416	02WV081004	SSL	02N1115
M	S02WV081004	144259	08/14/2002	actual site observa...	143416	S02WV081004 Highsplint	NSSL	02N1115

Figure 25.—A screenshot showing the Lab Source ID and the Lab Pedon #. (Step 13a)

    b. The “Lab Sample #” column in the Pedon Horizon Sample table.

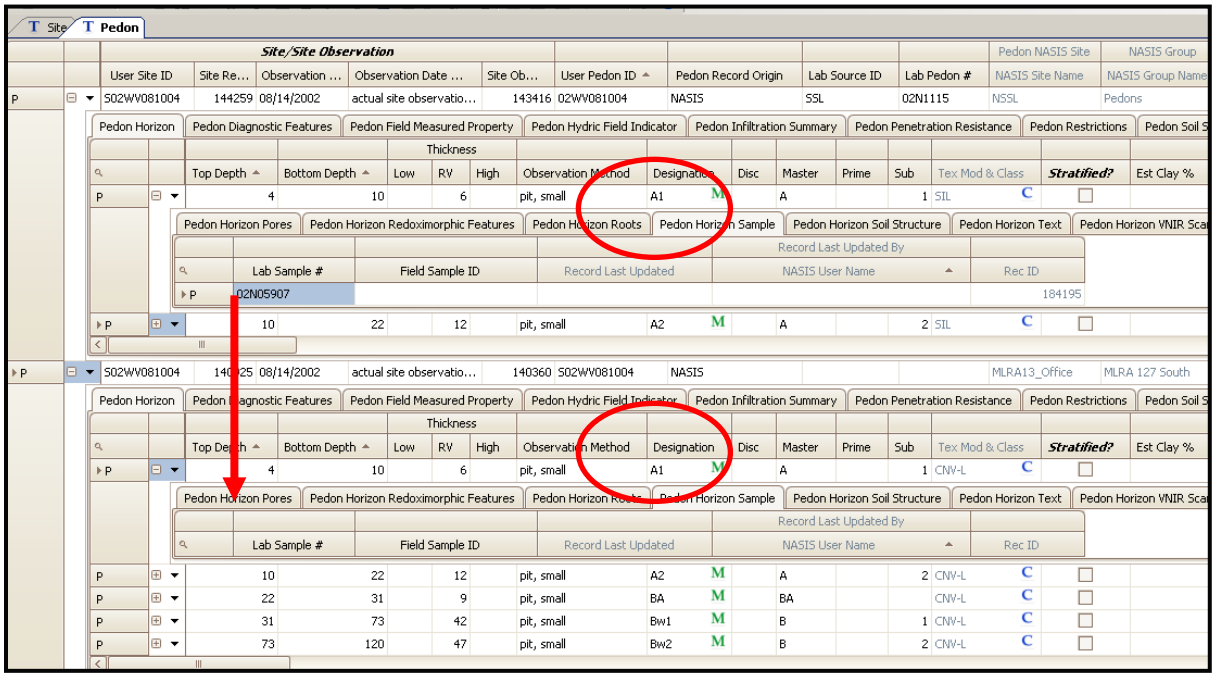


Figure 26.—A screenshot showing the Lab Sample #. (Step 13b)

These fields in the KSSL and MLRAxx_Office pedons must match.

c. When the Lab Source ID, Lab Pedon #, and Pedon Horizon Sample table are populated in the MLRAxx_Office pedon, the KSSL website will use the MLRAxx_Office pedon as the official record for the lab data reports.

For more information, refer to the *Soil Survey Laboratory Methods Manual* at http://go.usa.gov/V3uh and the *Soil Survey Laboratory Information Manual* at http://go.usa.gov/V3J4.