



United States
Department of
Agriculture

Natural Resources
Conservation
Service

430 G Street-4164
Davis, CA 95616-4164

Pacific Southwest MLRA Soil Survey Region (MO-2)
National Cooperative Soil Survey
Technical Note No. 430-17

Revised: March 25, 2009

SUBJECT: SOI - Archiving, Quality Assurance, and Distribution Processes for Progressive Soil Survey Digitizing Technical Note

Purpose. To provide MO-2 guidance for archiving digital soil mapping created at soil survey offices and to provide quality assurance and distribution procedures for this work.

Background. This technical note provides procedures for archiving, naming files, providing quality assurance, and for proper use and distribution of soil survey digital data for editing carried out at soil survey offices in MO-2. These are a complicated set of safeguards that are necessary in order to be successful in a variety of situations. Please consult with soil survey GIS staff if you have questions.

Archiving

Soil scientists are creating and editing digital soil mapping data at local soil survey offices. In order to protect these data from accidental loss or software/hardware failure the following archive procedures will be implemented:

1. **SOIL SURVEY LEADER** will establish an MLRA soil survey office archive procedure and communicate it to all soil scientists working on the project. This includes establishing a file naming standard. (See below for File Naming System.)
2. **SOIL SURVEY LEADER** will confirm that metadata notes are kept for capture scale of digitizing and imagery used. Brief metadata entries will be made in the Abstract section of the metadata in ArcCatalog for each geodatabase version that is sent for review. Notes in the Abstract and Purpose section could also be made for feature classes. (See How-To Appendix.)
3. **DAILY** -- All new or edited soil mapping data will be backed up to hard drive storage at the soil survey office. This means that a separate copy of the geodatabase will be saved on a separate hard drive from the active file being edited. This back up geodatabase will be renamed as below.
4. It is also necessary to **FREQUENTLY** save edits during an edit session in case the software crashes (IT WILL). **Saving edits is different from saving the map.**
5. It is also necessary to **FREQUENTLY validate topology and fix errors** while editing. (Separate topic.)
6. **DAILY – COMPACT** the geodatabases in ArcCatalog.
7. **WEEKLY** – All new or edited soil mapping data will be burned onto a CD or DVD and stored offsite for security. Updates can be added to previous media in order to maintain an archive of edited versions.
8. **MONTHLY – When soil mapping data are being updated**, send a copy of the geodatabase by compressing it into a WinZip file and sending as an email attachment (or on CD or DVD) to David Howell, or other designated soil survey GIS staff. If no edits have been made this is not necessary.
9. **YEARLY** – Send a copy of the overall geodatabase to GIS staff for quality Assurance. After GIS staff review this geodatabase will be sent to the review team leader. This current copy should be provided prior to reviews.

File Naming System

The soil survey geodatabase **will be set up by soil survey GIS staff** using the standards established at the NRCS Digital Soil Survey Mapping and Updating course. The **NRCS soil survey geodatabase template** will be used as a starting point. This geodatabase will contain a **feature dataset** in which several **feature classes** will be established. The names of the geodatabase, feature dataset, and feature classes will follow suggested naming described in this digital soil survey mapping and updating course. (The naming of archived copies given below is adapted from a method developed by Mike Hansen and NRCS staff in Montana.)

Copying, renaming, and compacting of geodatabases are done using ArcCatalog. There are how-to instructions in the Appendix of this technical note.

Soil survey offices will follow the Geospatial Dataset File Naming Standard established for NRCS offices as much as possible. This standard is available at:

<http://www.itc.nrcs.usda.gov/scdm/docs/SPG-GeospatialDatasetFileNaming.pdf>

Based on this standard structure the active soil project geodatabases will be stored in:
<drive>:\geodata\project_data\nrcs\soils\soil_stnnn\spatial\

<drive> is the drive where your geodata are stored; st is the two letter state abbreviation; and nnn is the three number soil survey number. We will use CA695 for examples.

In addition, each soil survey office will create a new folder (subdirectory) at this level
<drive>:\geodata\project_data\nrcs\soils\soil_stnnn\spatial\ and name it **Archive**.

The soil survey mapping geodatabase will be named PGnnn, where PG stands for **personal geodatabase** and the nnn is the three digit soil survey number, e.g., PG695.

Because we will be passing these geodatabases around during development and quality assurance processes, we will **append an identifier onto the name of the geodatabase to distinguish each process**.

The official copy of the geodatabase is stored at the soil survey project office. Append the word OFFICIAL to the name, e.g., PG695_OFFICIAL. The soil survey leader is responsible for its security and currency. This geodatabase will store the official soil map unit polygon feature class.

The **feature dataset** within that geodatabase will be named FDnnn, where the FD stands for **feature dataset**. This feature dataset will store the soil map unit polygon feature class and other soil survey feature classes, deemed necessary, from the list outlined in the Digital Soil Survey Mapping and Updating course material. The topology will be established within this feature dataset. The topology is used for validating proper editing and managing data integrity.

The feature class of the soil map unit polygons will be stored within the FDnnn and will be named stnnn_a, e.g., ca695_a. **Again, this geodatabase, feature dataset, and feature class at the soil survey office will be the official copy managed by the soil survey leader.** This is the geodatabase that will be edited during the soil survey project.

A **COMPACTed copy** of the entire PGnnn_OFFICIAL (with FDnnn and the stnnn_a) will be stored in the **Archive** subdirectory **and on another computer**, e.g., the office server or the project leader's computer. The archive copy will be made using copy and paste in ArcCatalog. These copies will be renamed PGnnn_OFFICIAL_date. This is a versioned copy of the geodatabase. It can be distinguished from the OFFICIAL copy maintained by the soil survey leader by having the date appended to it, to show that it is just an archived version.

The PGnnn geodatabase will store the FDnnn feature dataset. Within FDnnn only NRCS soil survey template feature classes will be stored. **Do not store raster data or images within this geodatabase.** Feature **classes** should be stored **within this feature dataset** with its defined spatial reference (set up by soil survey GIS staff), **not as stand alone feature classes.**

The feature classes currently are:

ca695_a	soil map unit polygon feature class (controlled by topology)
ca695_topology	topology object
ca695_b	soil survey area boundary feature class
ca695_c	soil map unit linear feature class
ca695_d	soil map unit point feature class
ca695_dl	documentation line features, e.g., transects
ca695_dp	documentation point features, e.g., observation sites
ca695_f	questionable area flags, need verification point features
ca695_l	soil special feature lines
ca695_op	
ca695_p	soil special feature points
ca695_q	USGS 7.5' quadrangle boundaries polygon feature class (added)
ca695_upd	update mapping progress polygon feature class
ca695_int	initial mapping progress polygon feature class

The bold feature classes are a common minimum list.

Create a separate geodatabase for outputs from geoprocesses and other temporary data, like field review points. Store any other feature classes in this separate geodatabase. If you have intermediate geoprocessing files, e.g., clips, etc. these should not be stored in the soil mapping geodatabase. This could be called PG695_Working or PG695_Other etc. It is common to create outputs, so this can be very useful. It also avoids the creation of Shapefiles which are to be avoided as low integrity spatial data.

Option 1: Subdivided Approach

Soil survey leaders may choose to subdivide the digital soil mapping data, or not. It is important to make sure that there is only one feature class being edited for each part of the soil survey area. If the soil survey leader creates a separate geodatabase for a subset of the soil survey area, that portion of the soil survey area should be removed from the other portion of the OFFICIAL geodatabase. For example, if the soil survey area were subdivided into two parts there would be two geodatabases with names like PG695_OFFICIAL_WEST and PG695_OFFICIAL_EAST. The portion of the soil survey area being edited in PG695_OFFICIAL_WEST would not occur in the geodatabase called PG695_OFFICIAL_EAST. The west part in this example would be ERASED from the east part geodatabase, and vice versa. Please contact soil survey GIS staff to help set up these subdivided geodatabases. There are easy, safe ways to manage these subdivisions.

If small, individual mapping areas are created, they should be ERASEd from the stnnn_a feature class in the remaining larger OFFICIAL geodatabase.

The soil survey leader is responsible for managing the assignment and naming of these subdivided geodatabases.

Each individual soil scientist will be responsible for making frequent backups of their **COMPACT**ed geodatabase along with secure offsite copies.

When the subdivisions or assigned mapping area are complete and have been reviewed and approved, they will be **UPDATED** into the CA695_OFFICIAL stnnn_a to create the feature class of the entire soil survey area. The **UPDATE** will be done by soil survey GIS staff or the Soil survey leader

only. Please contact **soil survey GIS staff** for assistance. The **UPDATE** tool is the safest way to accomplish this task.

Option 2: NON-subdivided Approach

For small soil survey crews it may not be necessary to subdivide the soil survey area feature class. The staff members can just take turns editing the stnnn_a feature class in the PGnnn_OFFICIAL geodatabase. Edits will be made only on PGnnn_OFFICIAL.

Each time someone prepares to make edits to the official copy of the feature class they will check to **confirm** that copies of the current geodatabase have been saved and renamed. At least two backup copies should exist; one stored on the local drive in the **Archive** subdirectory and one on another computer. Each of the copies will be renamed PGnnn_OFFICIAL_year_date_initials. This date in the archive name should match the file date for the official geodatabase (Windows Explorer). This would have been the last date it was saved.

If these archive copies do not exist, the person will COMPACT the geodatabase and make an archive dated copy using copy, paste, and rename in ArcCatalog to these two locations, (this must be confirmed before editing the official feature class).

After these two archive copies have been confirmed the soil scientist can proceed with the edits on the official copy of the feature class. At the end of the edit session the geodatabase will be **VALIDATED** again using feature dataset topology and identified errors will be fixed. It will then be saved. Then it will be COMPACTed in ArcCatalog. The copy will be made and the copy will be renamed to PGnnn _OFFICIAL_year_date_initials, e.g., PG695_OFFICIAL_2009_0410_dh. The date will be formed as follows: _YYYY_MMDD. This records the date the edits were made to this version of the feature class in the OFFICIAL geodatabase, and who made the edits. It is recommended that the copy be made immediately at the end of an edit session and saved in the two backup locations.

If you make many edits in one day you may want to make an archive copy in the middle of the day and one at the end of the day. (All software crashes.) These could be named with *am* and *pm* added to the names following the date.

In this way if there is a loss or corruption of the official copy of PGnnn_OFFICIAL you can copy and paste the most recent archive version to the active folder. Confirm that it is a good copy of the latest version. Then delete the corrupted PGnnn_OFFICIAL and rename the most recent copy to be the official geodatabase PGnnn_OFFICIAL. **The more frequently you save edits and make archive copies, the less work you will have to repeat in the event of corruption or data loss from a crash.**

This naming system should also be used for the data that are stored offsite on CD, DVD, or other media. **If you consider emailing the geodatabase somewhere remember that our email system doesn't accept Microsoft Access (*.mdb) attachments. Simply compress the file into a WinZip file and attach the zip file instead.** Sometimes this is blocked also, so contact soil survey GIS staff if you need help.

The file structure would look something like the following example:

Geodatabase: **PG695_OFFICIAL**

Feature Dataset: FD695

Feature Class: ca695_a

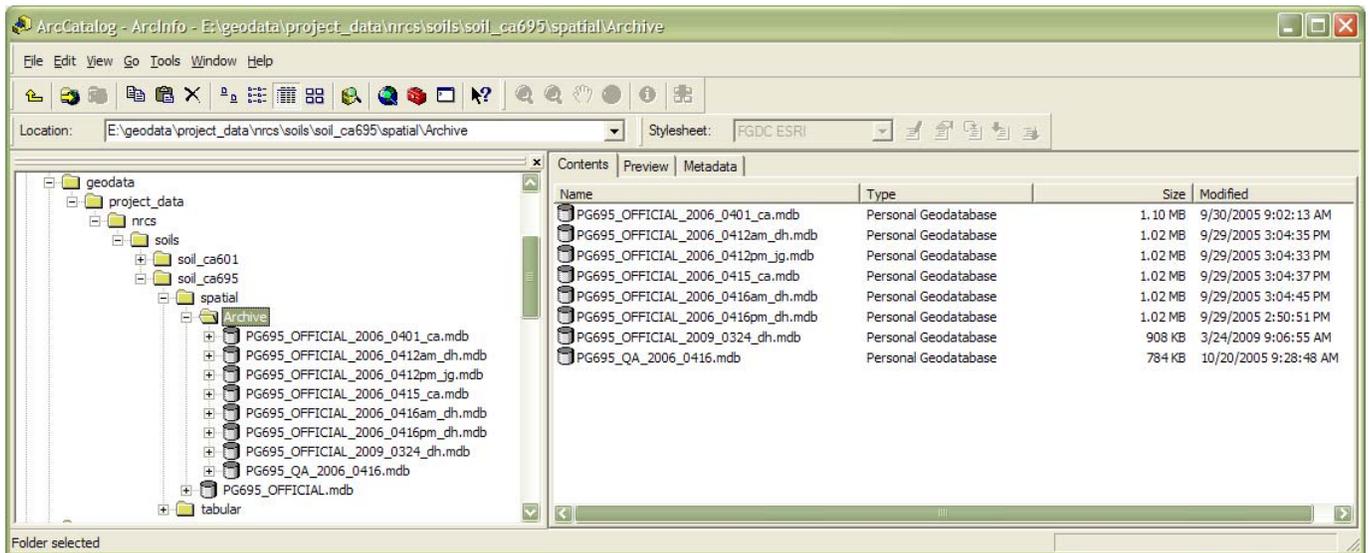
Topology: ca695_a_topology

Feature Class: other feature classes such as SSA boundary, quads etc.

Geodatabase: **PG695_OFFICIAL_2009_0324_dh (stored in two locations as backups)**

Feature Dataset: FD695

Feature Class: ca695_a
 Topology: ca695_a_topology
 Feature Class: other feature classes such as SSA boundary, quads etc.



For subdivided survey areas we would add (**along with their archived copies**):

Geodatabase: **PG695_OFFICIAL_WEST**

Feature Dataset: FD695
 Feature Class: ca695_a_west
 Topology: ca695_a_west_topology
 Feature Class: other feature classes such as SSA boundary, quads etc.

Geodatabase: **PG695_OFFICIAL_EAST**

Feature Dataset: FD695
 Feature Class: ca695_a_east
 Topology: ca695_a_east_topology
 Feature Class: other feature classes such as SSA boundary, quads etc.

(These geodatabases would only include a portion of the mapping area.)

Sending the Geodatabase for Quality Assurance and GIS Archiving

Prior to sending the geodatabase the soil survey leader will add metadata notes, **COMPACT** the geodatabase and make a copy using copy and paste in ArcCatalog and then rename the copies following this naming standard.

The soil survey leader will make a copy and append **QA_year_date_initials** to its name, e.g., PG695_QA_2009_0410_ca when the geodatabase is passed to the review team leader or other staff for **quality assurance** review.

The soil survey leader is responsible for adding information to the Abstract section of the metadata prior to sending for review.

While the Review Team Leader has the review copy there should be NO EDITS MADE ON THE PGnnn_OFFICIAL geodatabase at the soil survey office until the Review Team Leader says that they are done. **Edits to the soil polygons will be made by the soil survey office staff.** But the review team leader may create a feature class to indicate points where they have comments on

the reviewed mapping. This feature class will be called **stnnn_f_year_date**. If this feature class is created, the **review team leader will add metadata notes which will include their name, compact the geodatabase, copy, and rename it, with the current date** prior to returning it to the soil survey leader. The review team leader should retain a copy of this version of the geodatabase so that the stnnn_f flags and comments can be reviewed during the next field review.

When the geodatabase is sent to the **GIS staff for archive backup**, append **GIS_year_date_initials** to the name, e.g., PG695_GIS_2009_0410_ca.

Quality Assurance

1. Soil survey leader will complete 100% review of digital data prior to copy being sent to soil survey GIS staff or review team leader. The soil survey leader will check for incorrect or missing symbols, unnecessary small polygons, or common soil lines.
2. Soil survey leader validates topology for entire feature class and fixes identified errors.
3. Review team leader will evaluate landscape registration and map unit concepts. An additional brief review will be completed at the end of the survey.
4. Soil survey GIS staff will review MONTHLY copies for quality of boundary line work and geodatabase properties.

Advanced Digital Soil Information Distribution

Spatial data will only be distributed through the Soil Data Mart. Only approved map units will be posted to the Soil Data Mart.

In progressively digitized mapping which includes areas with provisional map units and/or unmapped areas, these provisional or unmapped areas will have the MUSYM attribute set to NOTCOM.

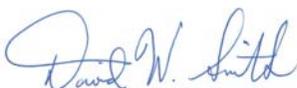
Progressive digital soils data will be updated on the Soil Data Mart following review and approval by the review team leader and the state soil scientist. This may be done annually following the progress review. The update interval will be determined on a case-by-case basis by the state soil scientist, review team leader, and soil survey leader.

Testing Attribute Data at the Soil Survey Office

NASIS data can be exported in SSURGO data format. These data can be loaded into the SSURGO Microsoft Access template and joined to the progressive digital soils polygon data. Soil survey office staff can use this for testing the attribute and spatial data and use this as a basis for editing or for other uses. Assistance is available from soil survey GIS staff.

These data will not be distributed to anyone outside the soil survey staff. The soil survey office will not distribute digital spatial data.

The procedures for archiving, quality assurance, and distribution described above are intended to provide mechanisms to ensure that we distribute only high quality digital soil spatial data that is ready for public use.

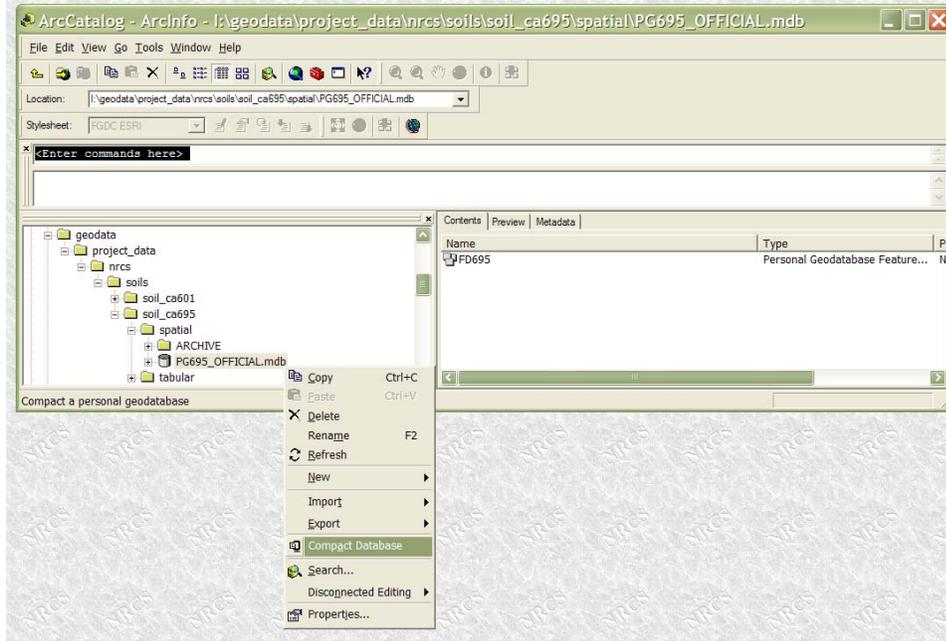


DAVID W. SMITH
Pacific Southwest Soil Survey Regional Office Leader (MO-2)

How-To Appendix

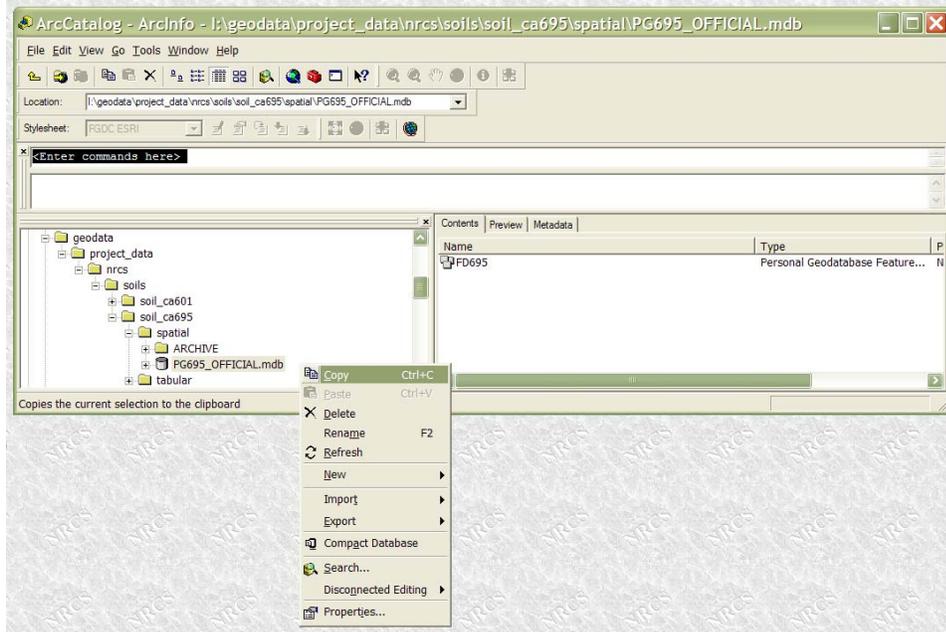
Compact geodatabase

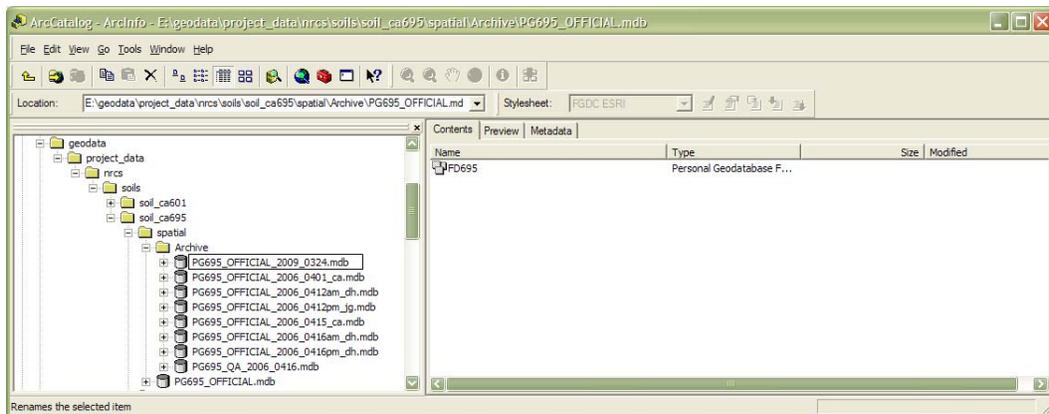
Right-click on the geodatabase that you want to compact and then left-click on Compact Database. This should be done daily when you are actively editing the data.



Copy/Paste/Rename (Always COMPACT prior to copying!)

To Copy: right-click on the geodatabase name in ArcCatalog. Left click on Copy.





Left-click at the end of the geodatabase name, before the period and the file extension and type the new part of the name.

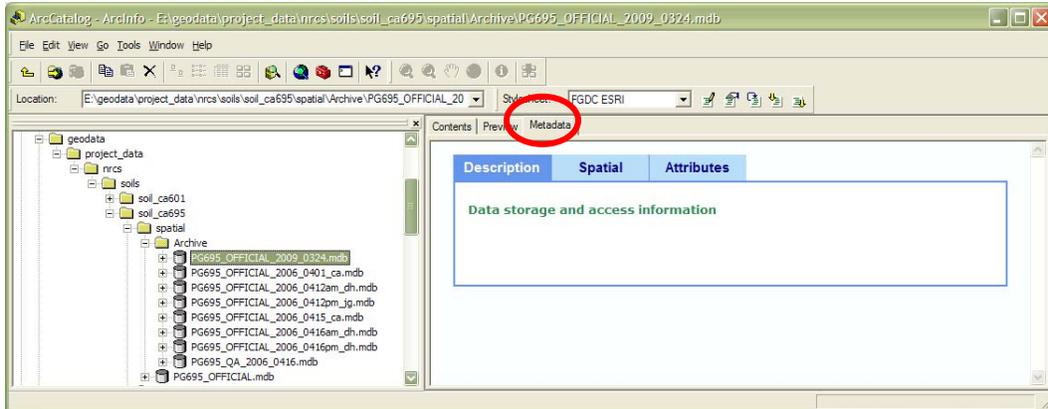
The Archive subdirectory will accumulate an archive of past versions of the geodatabase.

Sending the Geodatabase

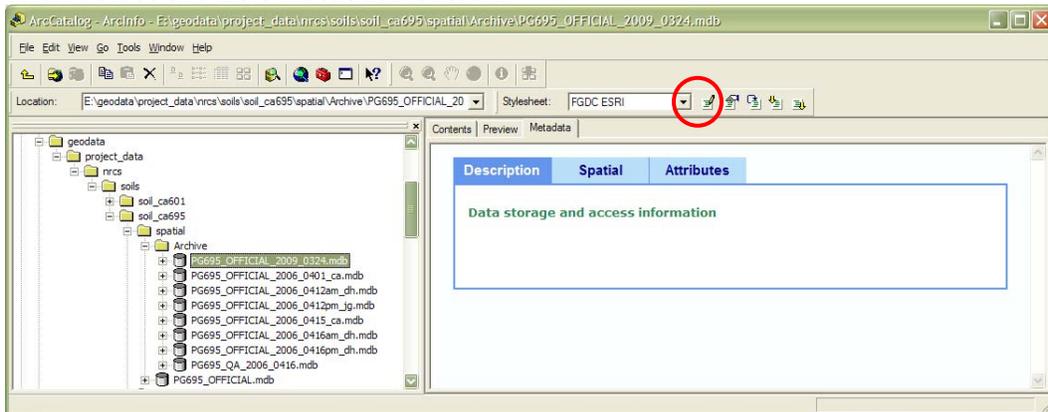
If you consider emailing the geodatabase somewhere remember that our email system doesn't accept Microsoft Access (*.mdb) attachments. Simply compress the file into a WinZip file and attach the zip file instead.

To add metadata: MINIMUM

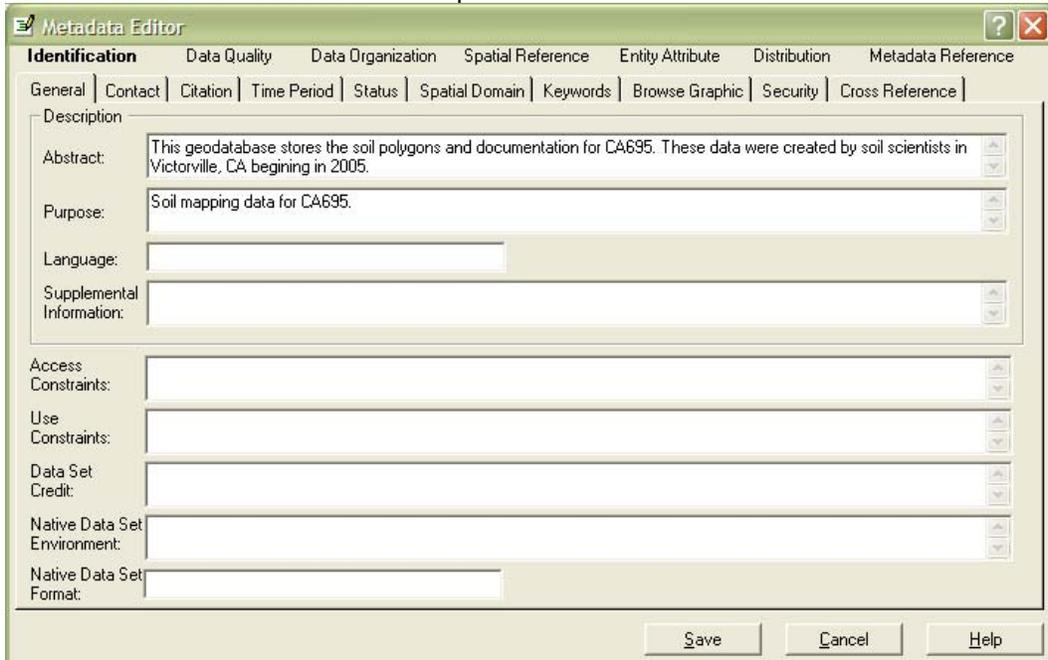
Left-click on the geodatabase and then select the Metadata tab. This will create metadata for the entire geodatabase.



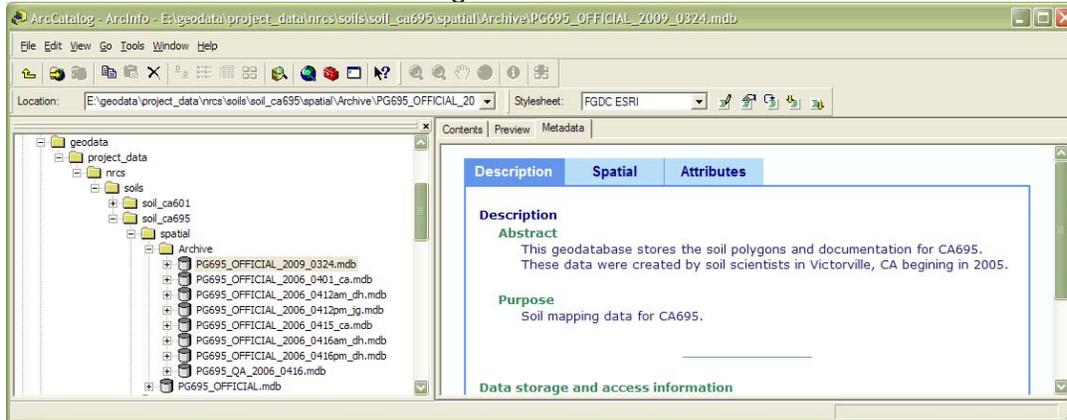
Then select the Edit Metadata button.



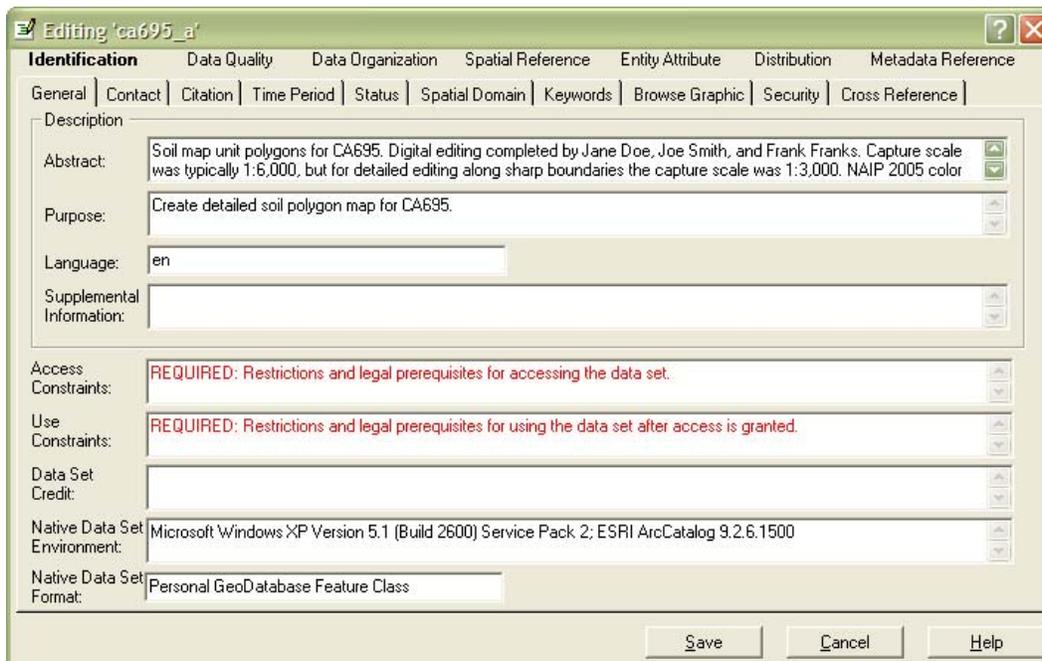
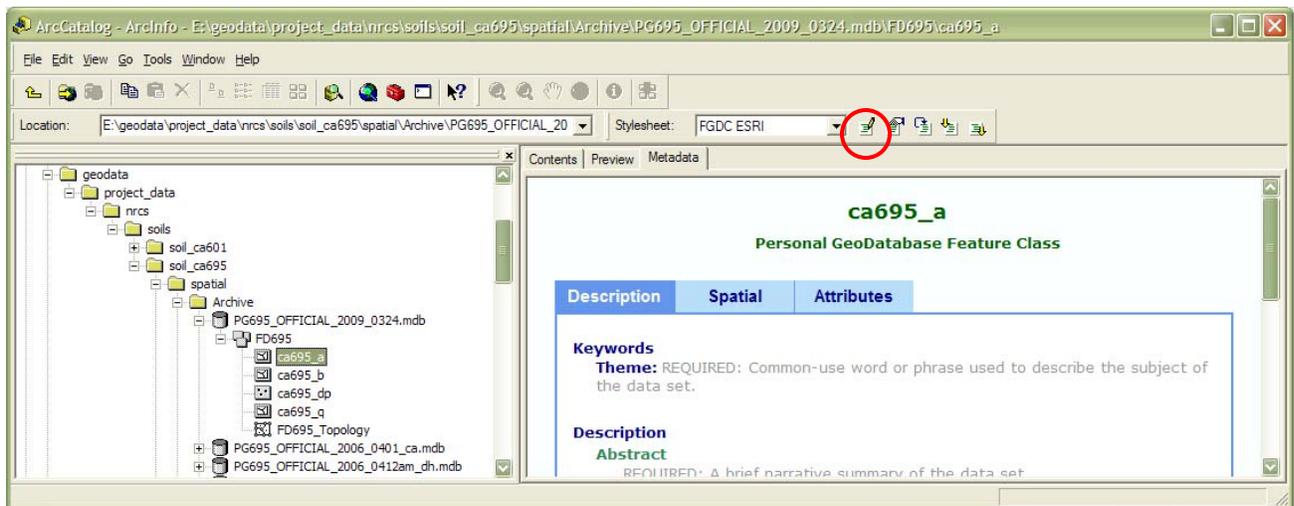
Add notes in the Abstract and Purpose sections - MINIMUM.



New metadata listed in ArcCatalog.



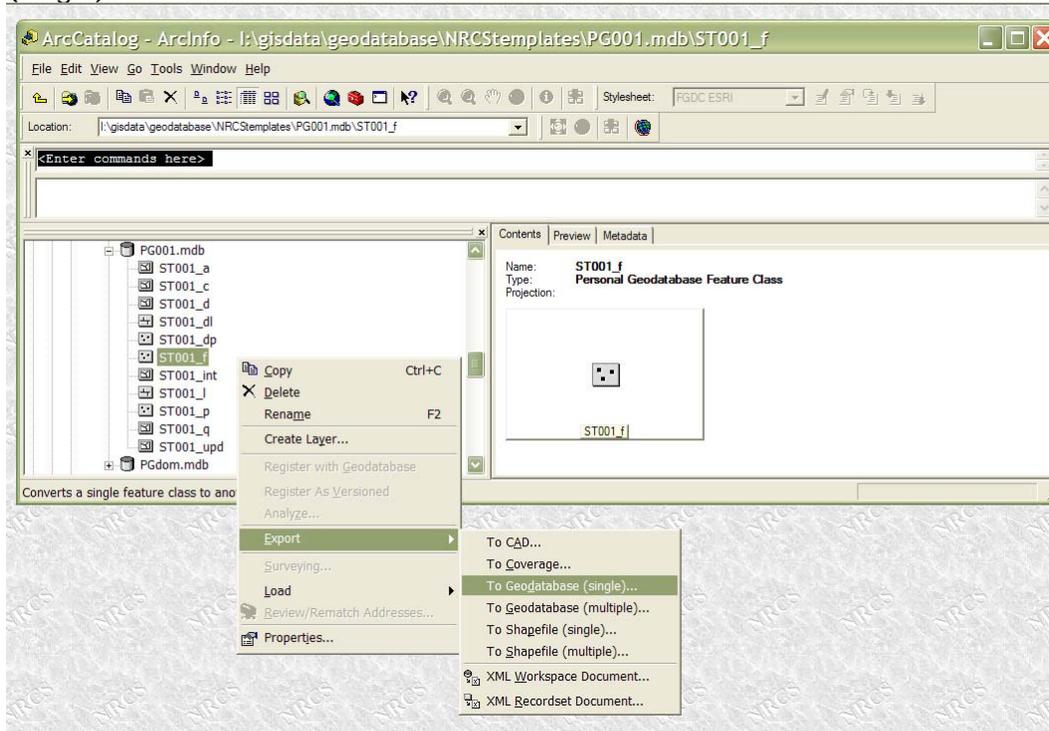
Creating **feature class** metadata. Left-click on feature class and select the Edit Metadata button.



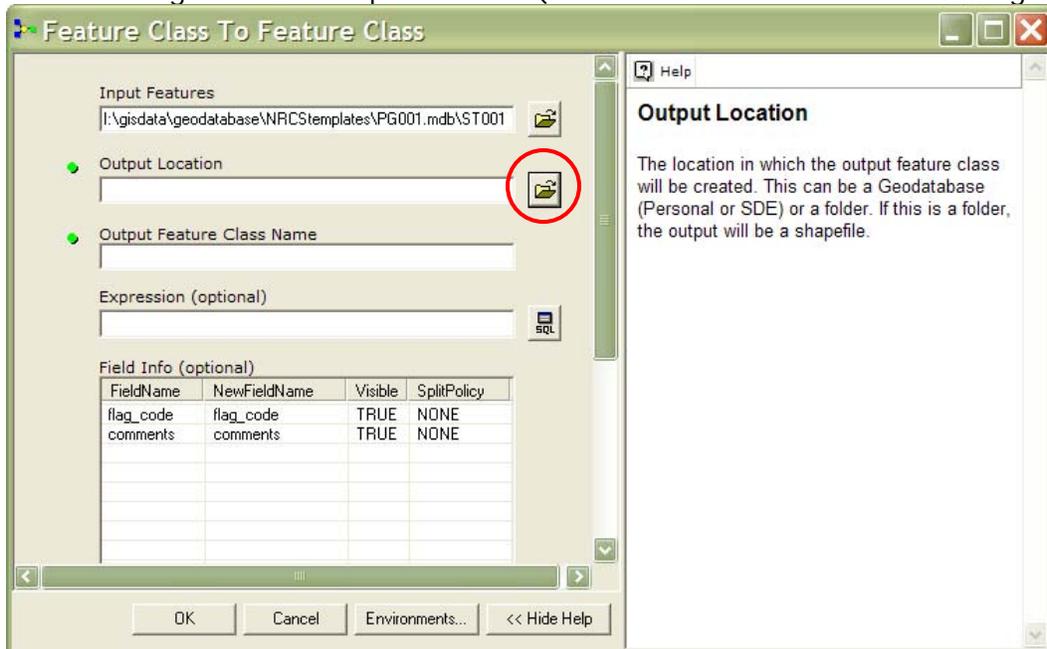
Create Flag point feature class during QA review

This procedure would occur each time (annually) the review team leader receives a QA version of the geodatabase for review and they have comments or questions about the mapping.

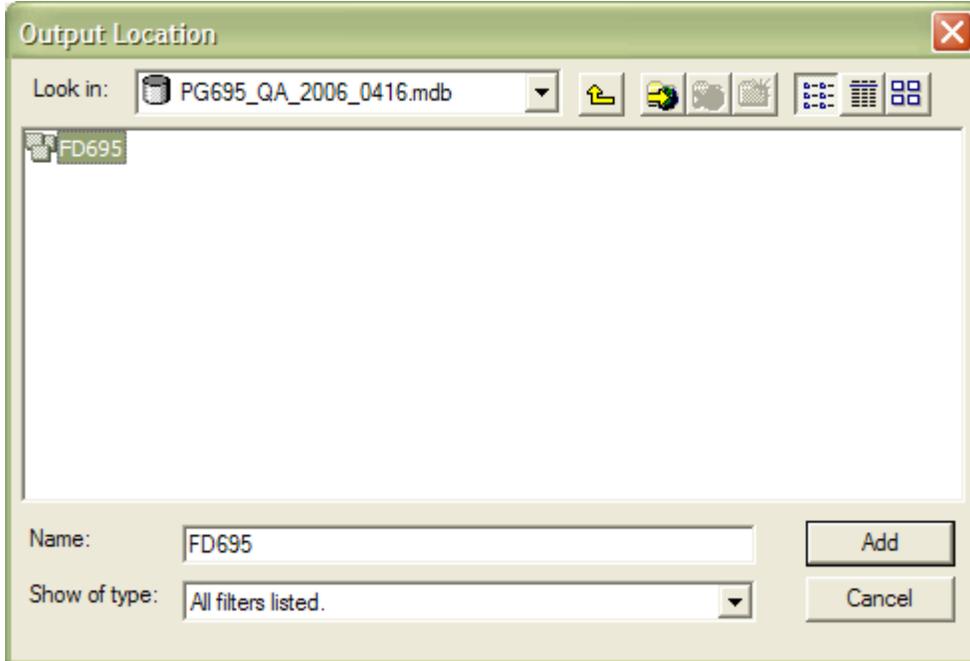
The review team leader locates the NRCS soil survey template geodatabases. Open PG001.mdb. Right-click on the ST001_f feature class, select Export, select To Geodatabase (single).



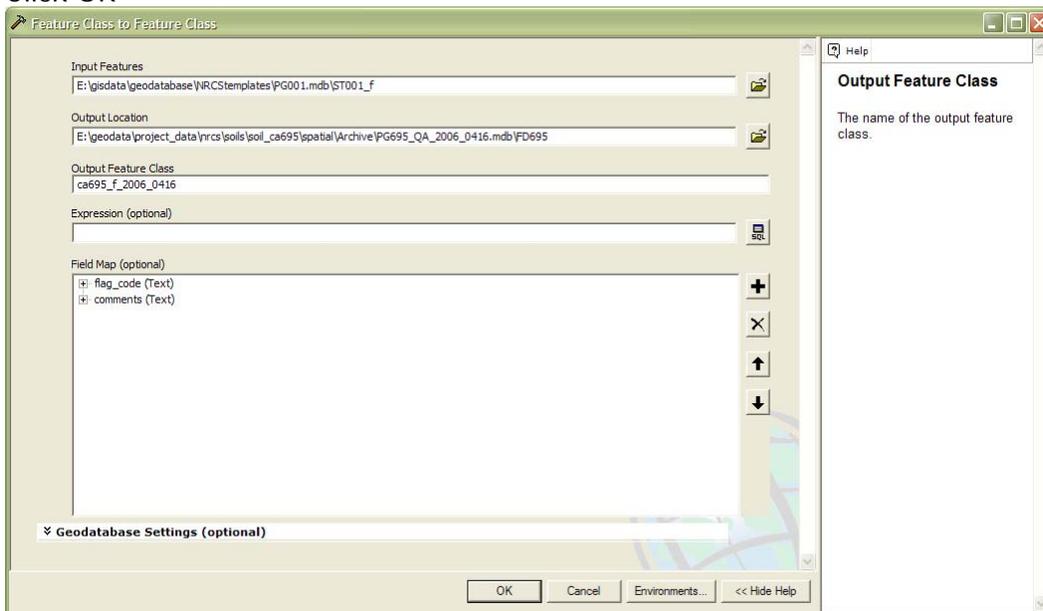
Click to navigate to the output location (The feature dataset within the QA geodatabase)



Left-click once on the FD695 feature dataset to select it. Click the Add button.

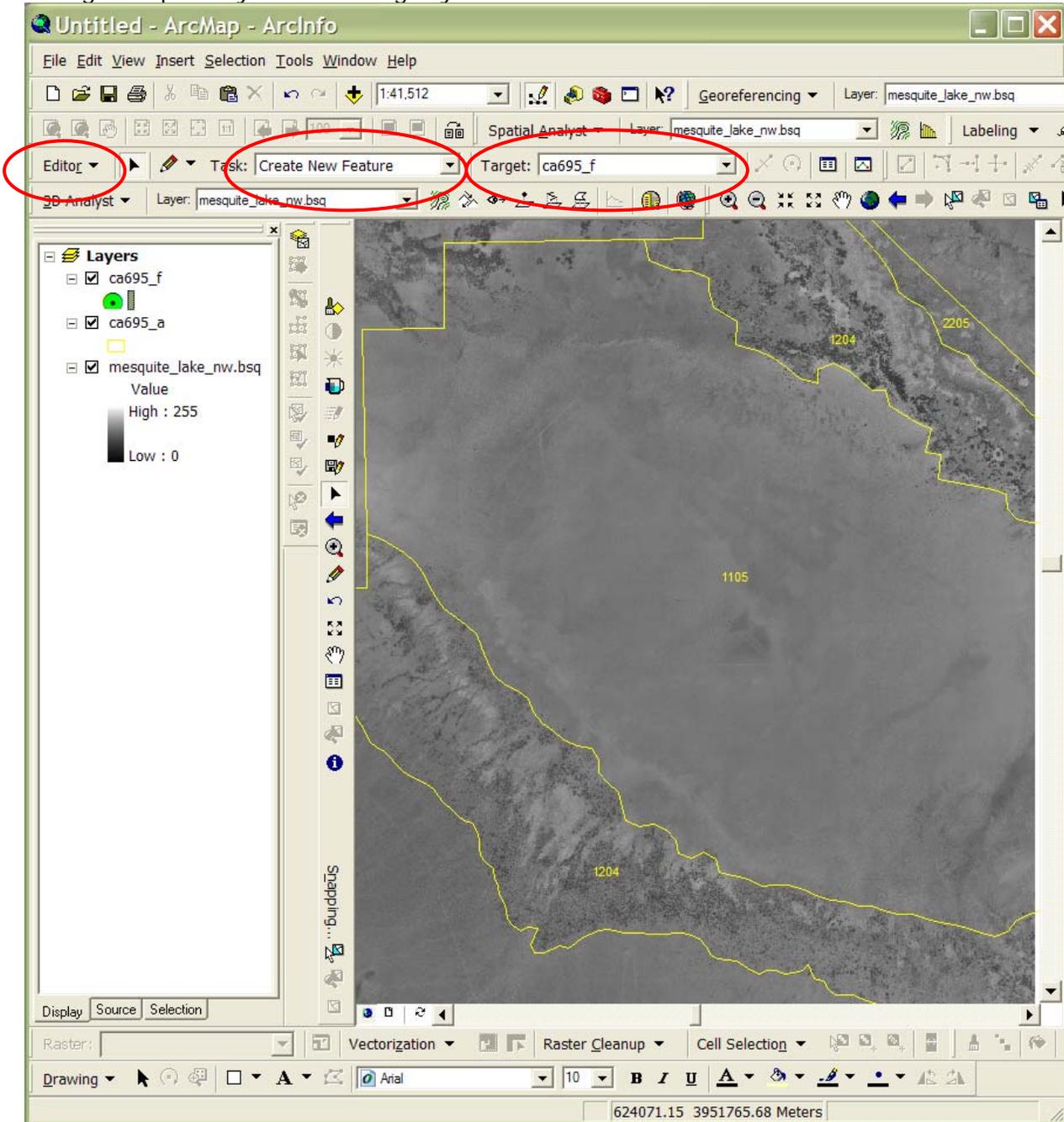


Type in the name of the feature class for this geodatabase, stnnn_f_year_date. Click OK

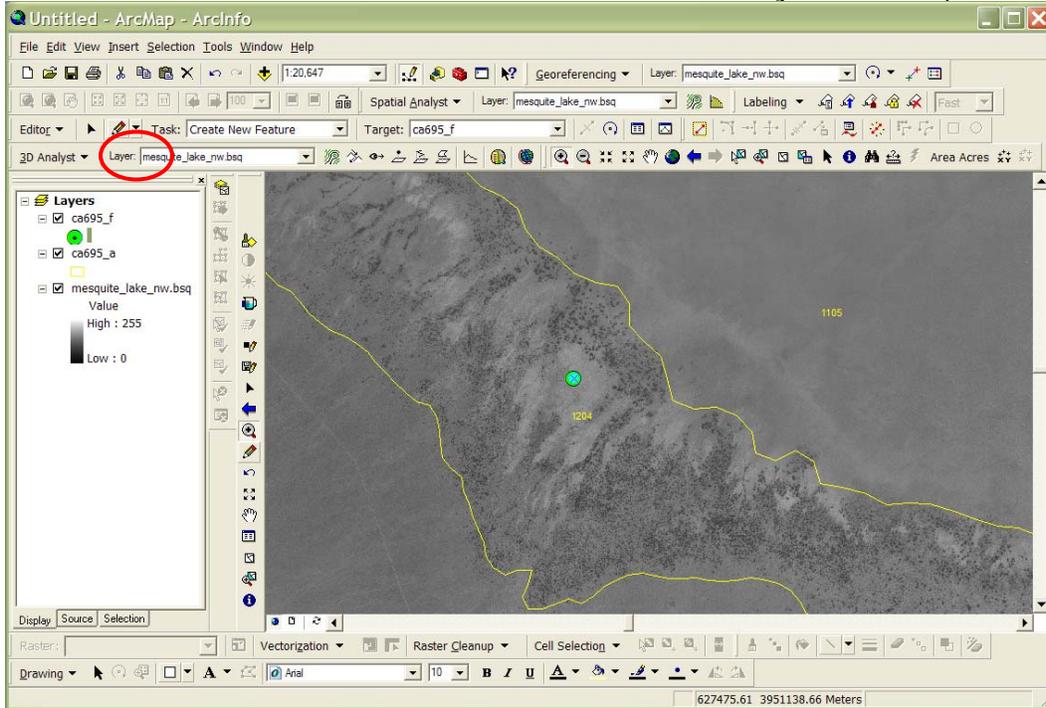


Using the flag point feature class for QA review

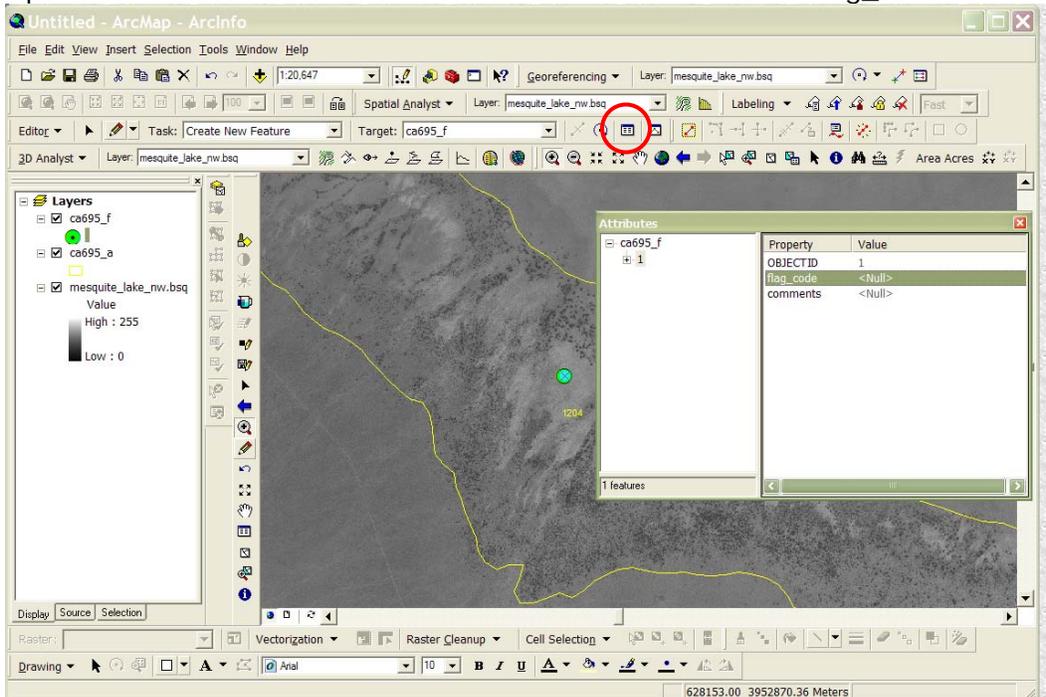
Start an ArcMap session. Load the feature classes from the QA geodatabase and whatever imagery is needed for the review. Start an edit session. **Use the Create New Feature task and set the target to the flag point feature class, ca695_f in this simplified example.** Change the point symbol to a large symbol.



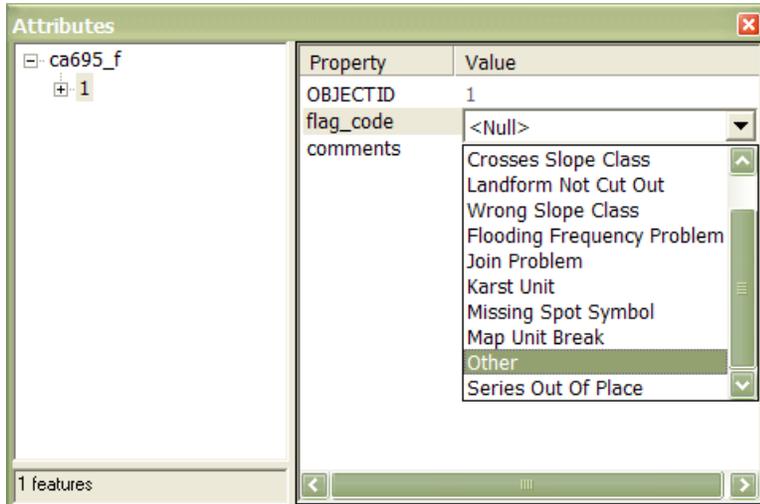
Select the sketch tool and left-click at the location where you want to place a point.



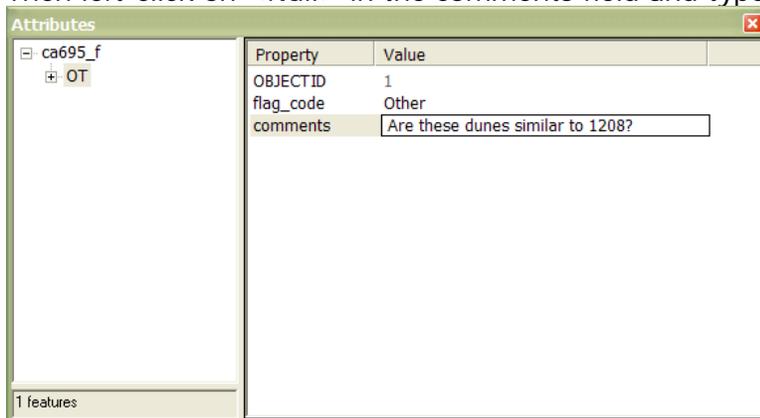
Open the attribute editor. Left-click on the <Null> value for flag_code.



Choose from the domain list.



Then left-click on <Null> in the comments field and type in comments.



When the review is completed save edits, stop editing, and save map document if desired. Add metadata to the geodatabase and to this feature class before returning the geodatabase to the soil survey leader.