

# Soil Resource Inventory Tool Box (SRITB)

## Southern Regional Cooperative Soil Survey Conference

July 15, 2008

Henry Ferguson and Sharon W. Waltman, USDA-NRCS  
National Geospatial Development Center  
Morgantown, WV

# What is SRITB?

- Soil Resource Inventory Toolbox
- Initiative by Soil Survey Division to provide automated tools for field soil scientists

# Communication – National Bulletins

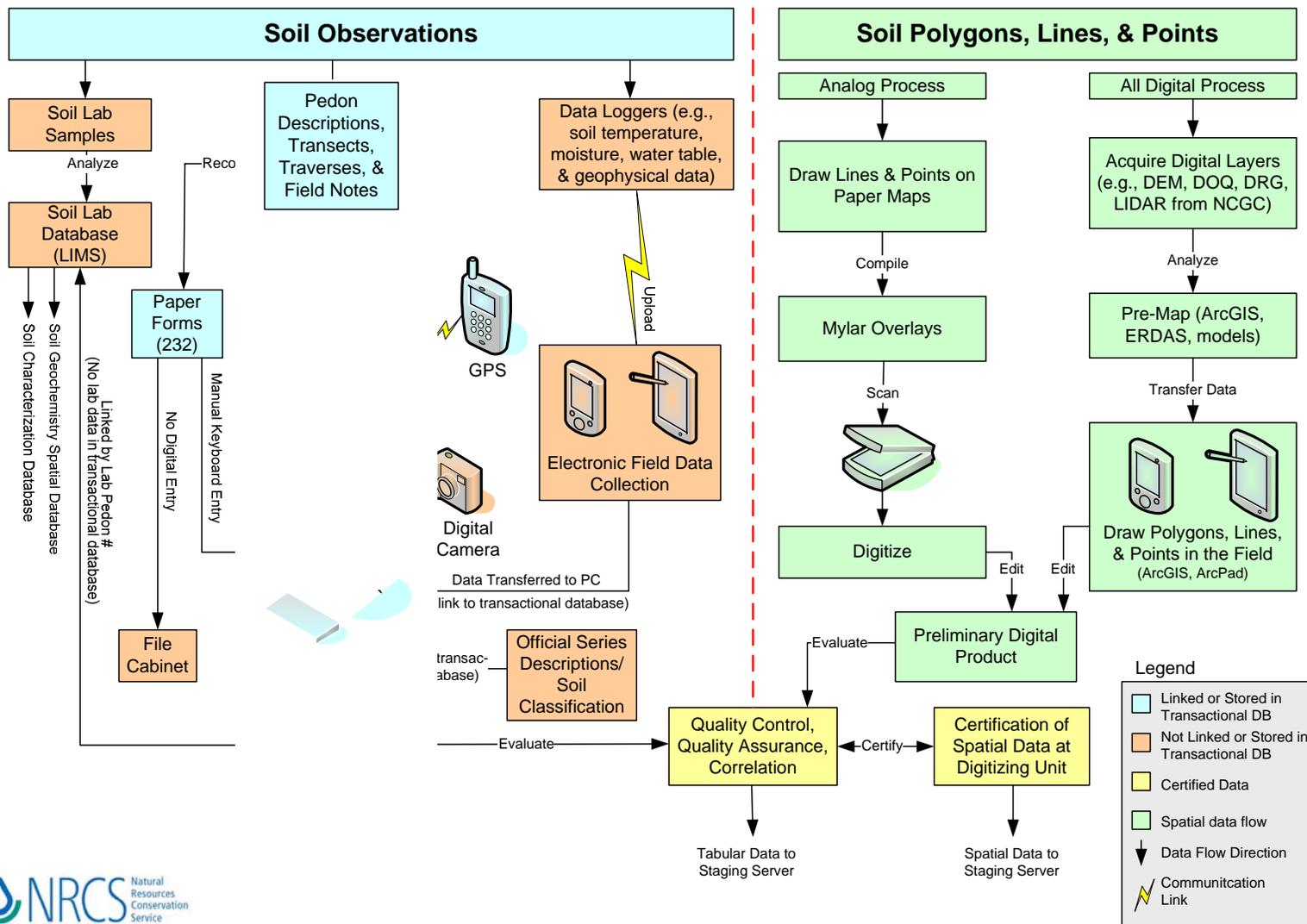
- SOI – Pedon PC Software Release 430-6-2 April 18, 2006
- SOI – Development of a Soil Resource Inventory Toolbox March 28, 2007
- SOI – Pedon PC 3.0 Software Release May 11, 2007
- SOI – Pedon PC 3.0I Software Release February 29, 2008
- SOI – Soil Resource Inventory Toolbox Software Release SRITB 1.1.18 May 27, 2008

# SRITB components:

- Pedon PC
- Analysis PC
- Lab Database Entry Program
- Editing Toolbar (ArcMap extension)
- Soil scientist's "My Toolbar" (desktop)

# Inventory & Interpret Soil Resources: Data Flow Diagrams

2/2006



# Pedon PC

- Prototypes were developed in the field (Montana Migrator and Pedon CE)
- Field soil scientists were major players in the appearance and functionality
- Forms are designed for use in Microsoft Access
- Pedons are uploaded to NASIS via the Soils Hotline

- Task /Purpose

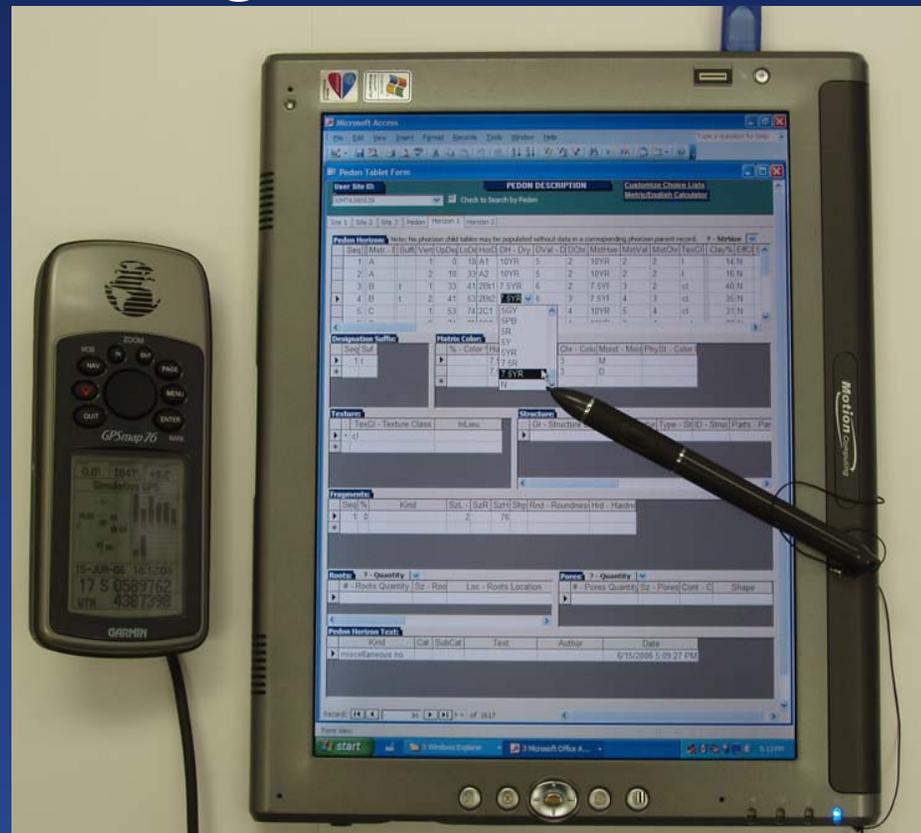
Emulate the (historic, and future) workflow in an electronic environment to increase efficiency and reduce the potential for the loss of data.



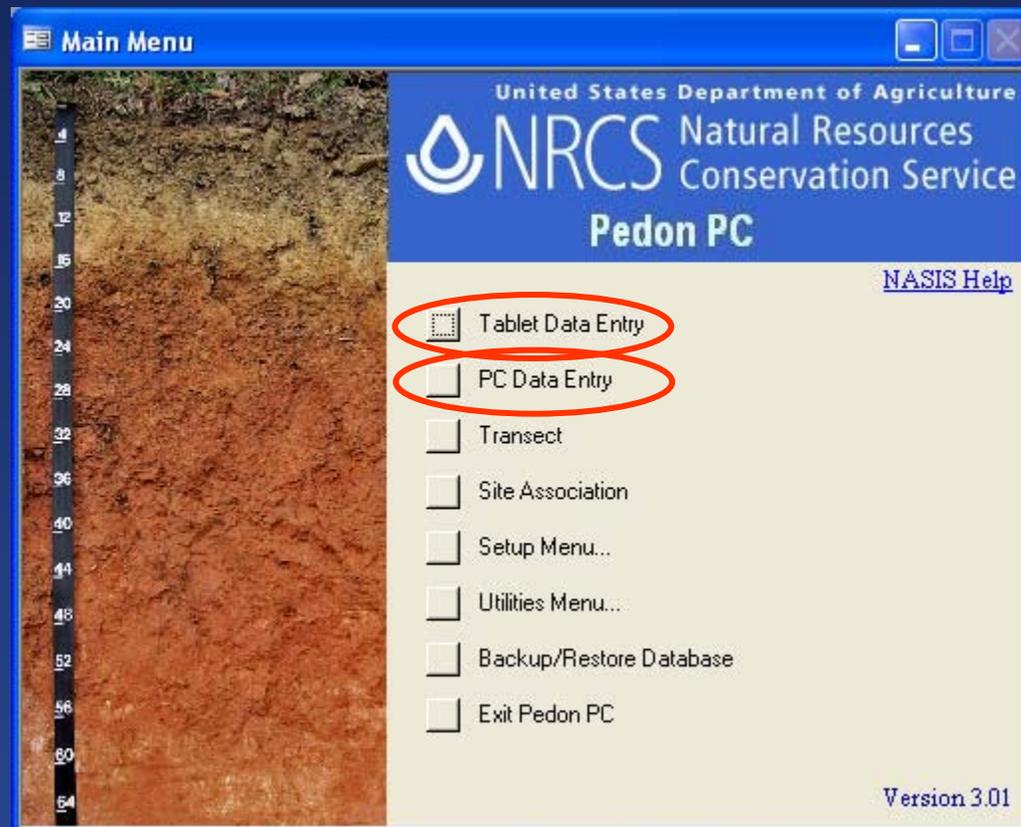
- Included the evaluation of hardware



- Development of form based data entry application (Pedon PC) for tablets which includes the integration of GPS for recording locations



# Pedon PC has two layouts:



# Pedon PC layout for PC (landscape)

PC Form

USDA-NRCS PEDON DESCRIPTION Search by User Site ID:   Check to Search by Pedon

Table hierarchy: site-->siteobs-->pedon-->phorizon You are currently on site record:  with a User Site ID:

# Pedon PC Tablet layout (portrait)

**Pedon Tablet Form**

**Search by User Site ID:**   Check to Search by Pedon

[PEDON DESCRIPTION](#)   
 [Customize Choice Lists](#)   
 [Metric/English Calculator](#)  
[Copy a Pedon](#)   
 [Calculations](#)

[Site \(Part 1\)](#)  
 [Site \(Part 2\)](#)  
 [Site \(Part 3\)](#)  
 **Pedon**  
 [Horizon \(Part 1\)](#)  
 [Horizon \(Part 2\)](#)  
 [Reports](#)

Note: Double-click a value in the Pedon table Transect ID, Soil Name As Sampled or Subgroup columns for special features. Selecting a pedon record will affect the horizon tabs because pedon is the parent table. If no pedon record is shown, the wrong site observation record may be selected on the Site (Part 1) tab or you may need to add a pedon record.

**Pedon:**

Rec ID	UPEDID - User Pedon ID	SoilName - Soil Name	CorrSoil	PSCS Top	PSCS Bot -	PedOr - Pedon	TempReg - Ter
▶	Sanpedro	Sanpedro		5	28		

**Pedon Text:**

Seq	Kind	Cat - Category	SubCat -	Text
▶				

To add horizon data please use the Horizon (Part 1) and Horizon (Part 2) tabs.

**Pedon Horizon: (Read Only)**

HorDes - H	UpDep	LoD	Seq	Horizc
A	0	5	0	
▶ Bt	5	18	0	
Btk	18	28	0	
Bk	28	43	0	
R	43	100	0	

**Pedon Diagnostic Features:**

Kind	TDeg	BDeg	ThkL	Thi
▶ mollic epipedon	0	43	0	
argillic horizon	5	28	0	
lithic contact	43	0	0	
calcic horizon	7	43	0	
*				

**Pedon Taxonomic Moisture Class:**

Seq	Moist - Moistur
▶	

**Pedon Taxonomic Mineralogy:**

Seq	Mineralogy
▶ 0	mixed
*	

# Both are customizable

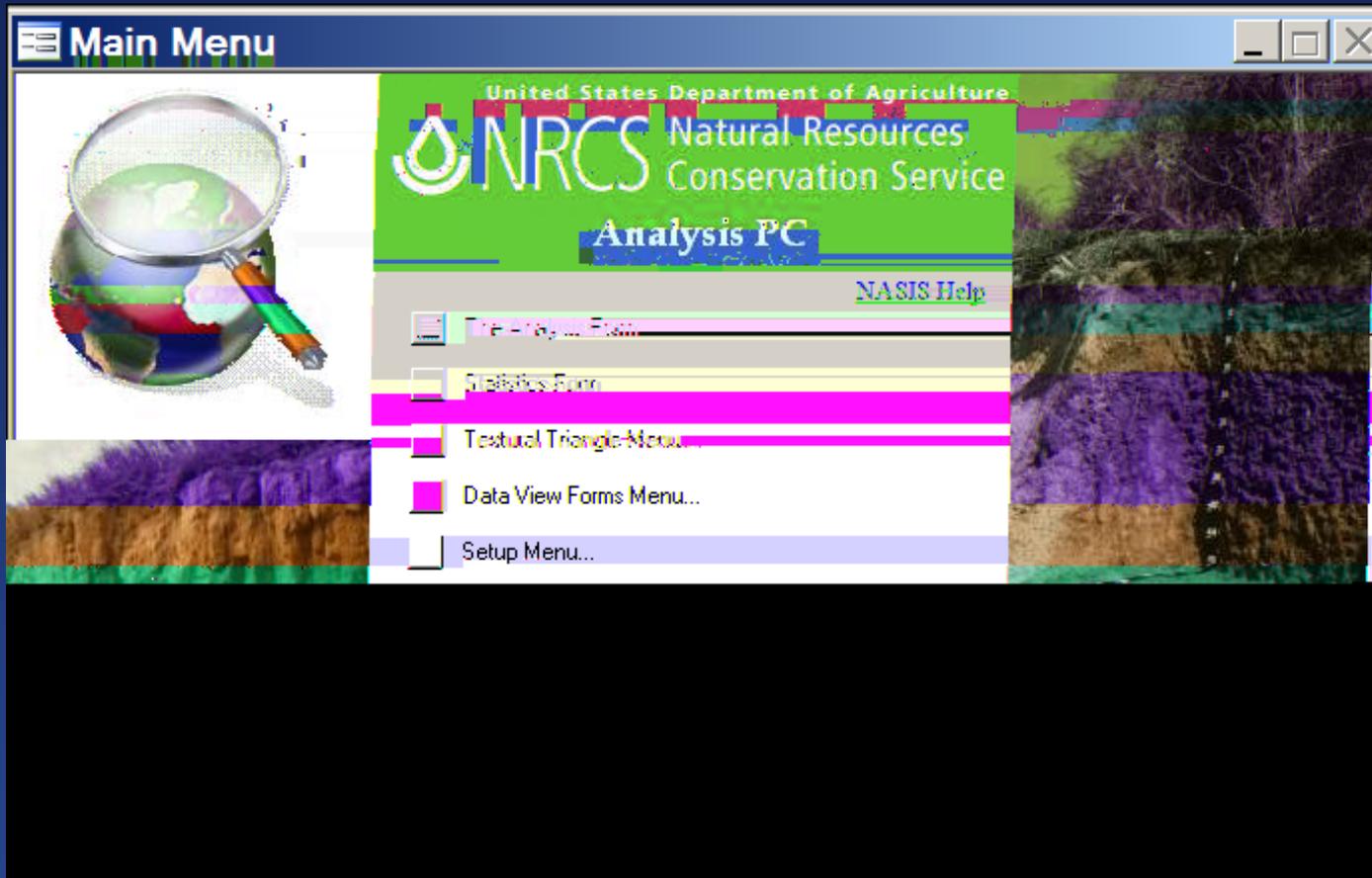
## Pedons (Points) In NASIS:

April 2005	142,487
March 2006	163,000
March 2007	190,445
Sept 1, 2007	209,209
June 11, 2008	243,445

# Analysis PC

- Prototypes developed in the field (Montana Pedon PC Plus)
- Forms built in Microsoft Access
- Links between Access and ArcMap

# Analysis PC main menu



# Analysis PC:

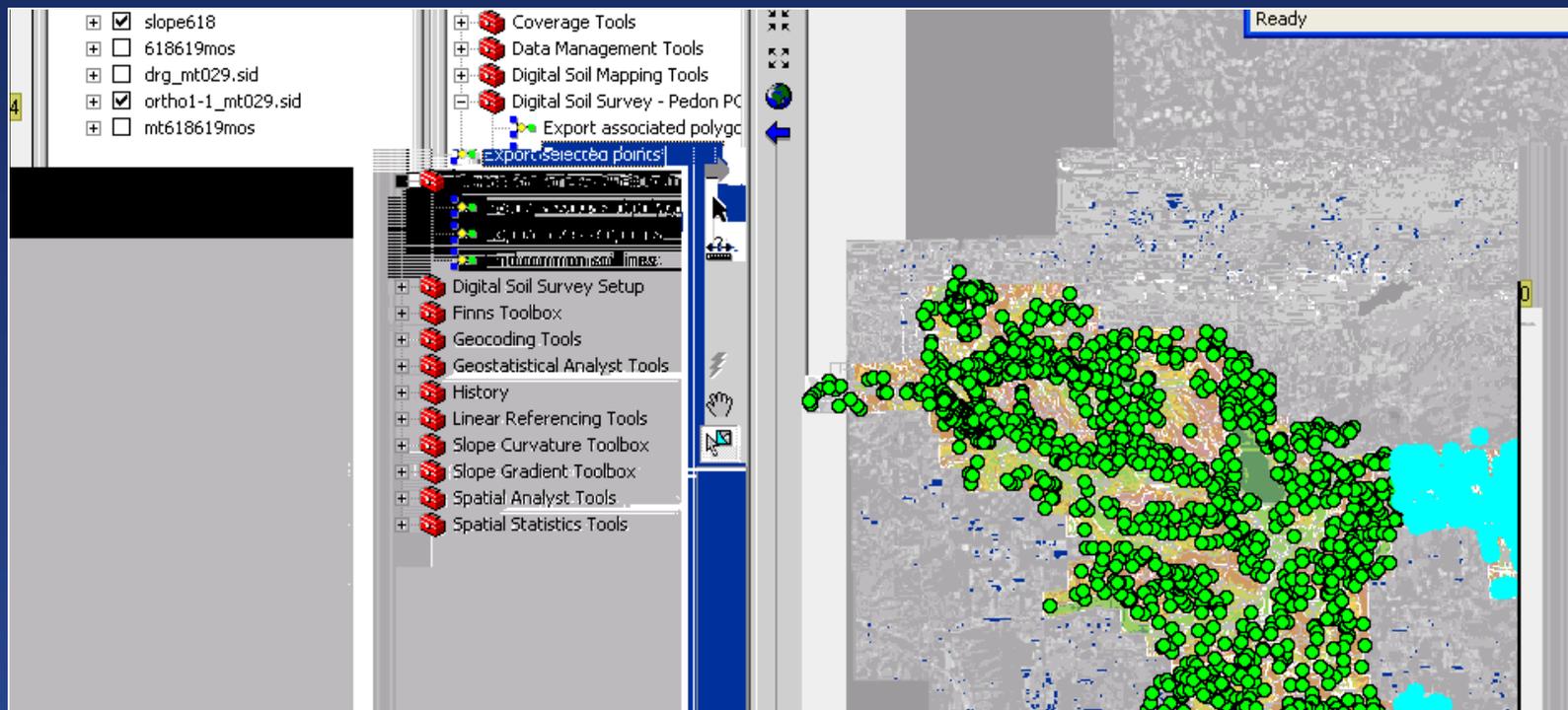
1. Analysis form: uses Access built queries to display selected sets

Query Name	Source	Has Points?	Enter Data:
all soils and plot	NGDC	Yes	
mapunit elements and plot	NGDC	Yes	
Site - slope, elev, USLE length, aspect	NGDC	Yes	
Site - slope, elev, USLE length (aggregate)	NGDC	No	
Site - aspect, 16 directions (aggregate)	NGDC	No	
Site - aspect, 8 directions (aggregate)	NGDC	No	
Site - geomorphic description	NGDC	Yes	
Pedon - taxonomic classification	NGDC	Yes	
Pedon - horizon sequence	NGDC	Yes	
Horizon - texture	NGDC	Yes	
Horizon - texture class mod lieu	NGDC	Yes	
Horizon - elements	NGDC	Yes	
Horizon - matrix color	NGDC	Yes	
Horizon - sand silt clay pH ec sar	NGDC	Yes	
Horizon - structure	NGDC	Yes	
Horizon - concentrations	NGDC	Yes	
Horizon - fragments	NGDC	Yes	
Horizon - roots	NGDC	Yes	
Horizon - pores	NGDC	Yes	

<input checked="" type="checkbox"/>	-270584	04LA017MOR		-269725	04LA017MOR	Meth	
<input checked="" type="checkbox"/>	-270583	04LA017MOR		-269724	04LA017MOR	Meth	
<input checked="" type="checkbox"/>	-270582	04LA017MOR		-269723	04LA017MOR	Cuthbert	
<input checked="" type="checkbox"/>	-270581	05LA017MOR		-269722	05LA017MOR	Keithville	
<input checked="" type="checkbox"/>	-270580	05LA017MOR		-269721	05LA017MOR	Keithville	
<input checked="" type="checkbox"/>	-270579	05LA017MOR		-269720	05LA017MOR	Keithville	

- Allows the user to send data to ArcMap

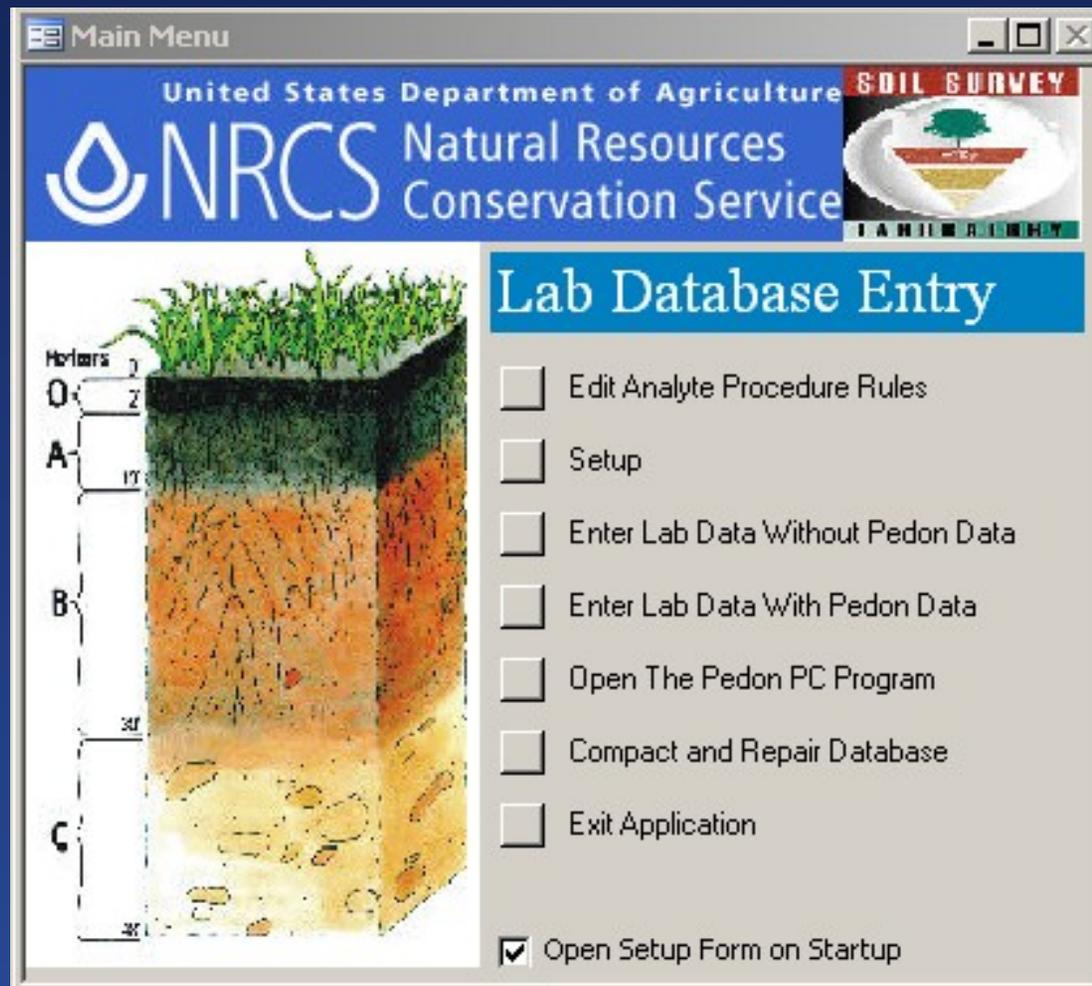


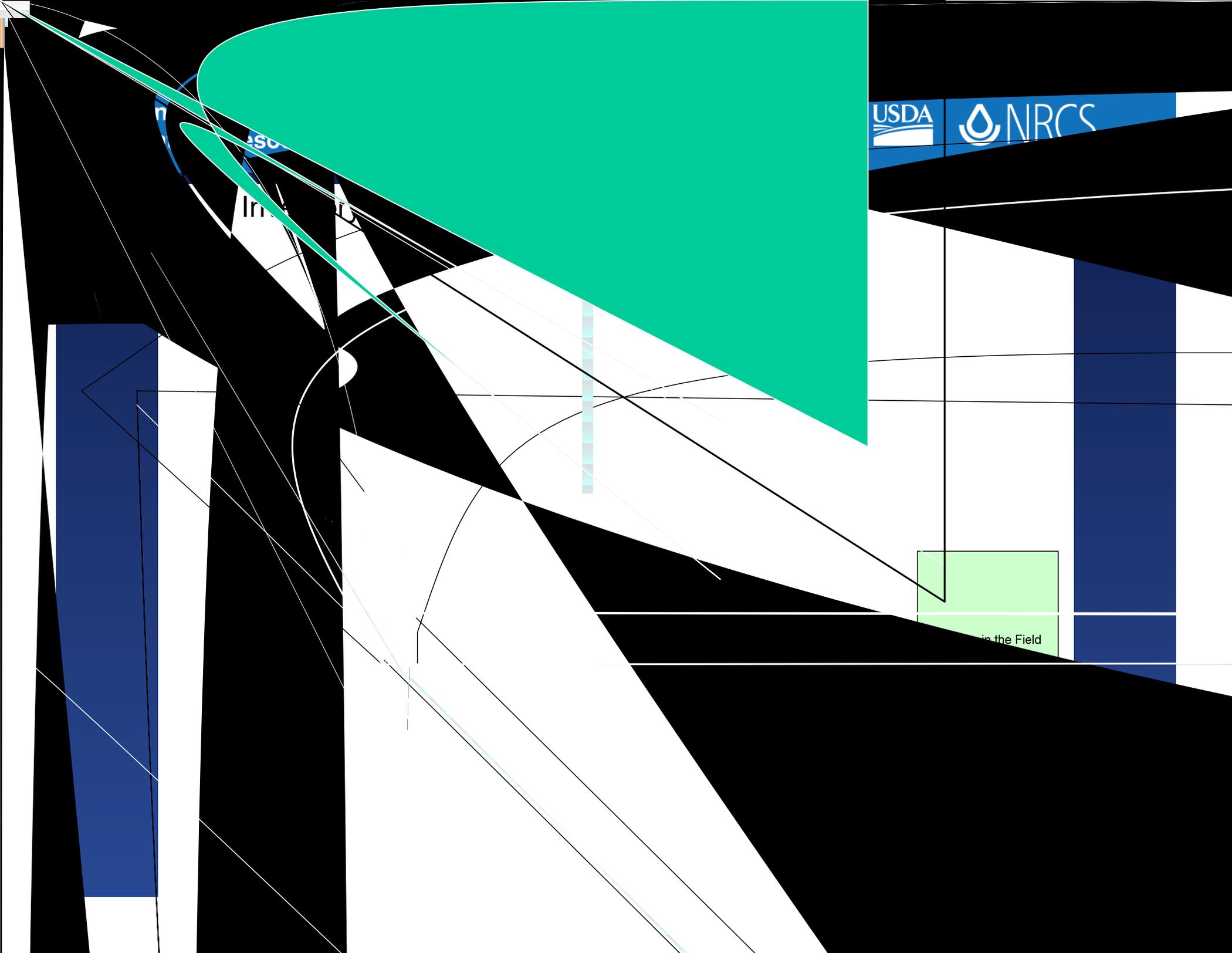


# Laboratory Data Entry Program

- Numerous universities, states, and other entities collect and store soil data
- Lab Database Entry Program is an attempt to centralize this external data into our system

# Lab Database Entry main menu





USDA

NRCS

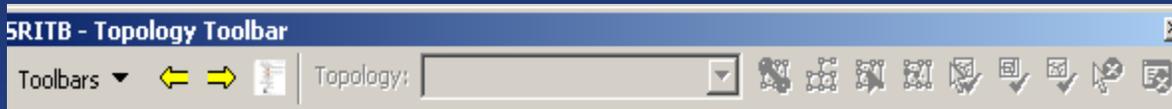
In

in the Field

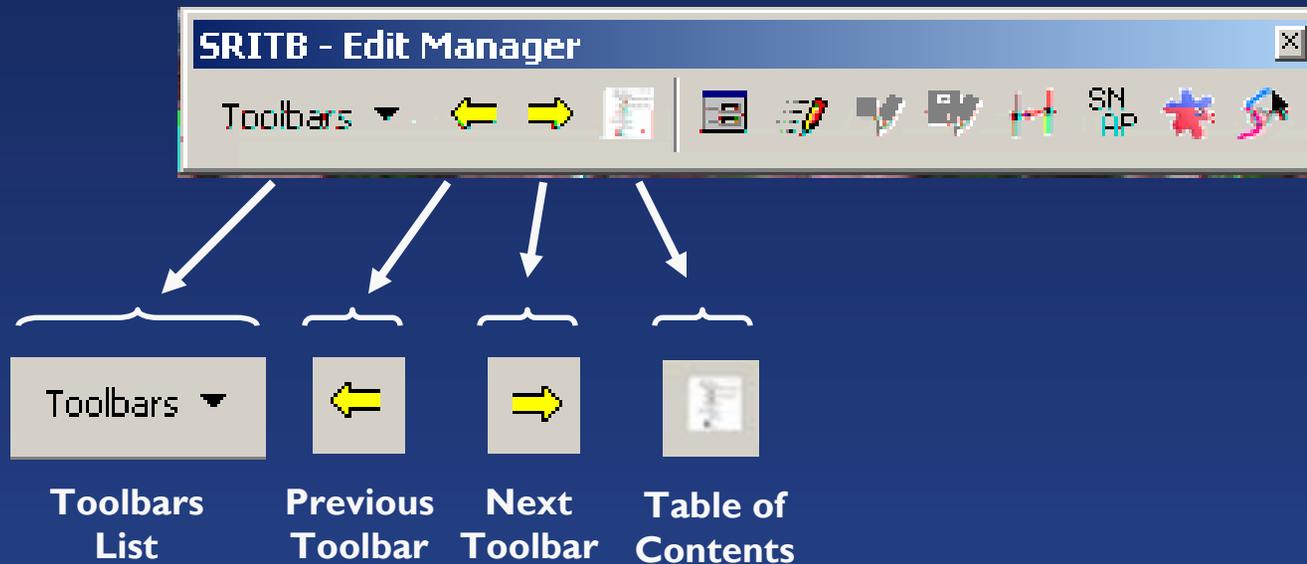
# Editing Toolbar

- Adds a suite of toolbars to ArcMap (loads as an extension)
- Programmed to simplify GIS digitizing procedures and data capture.
- Developed to increase the efficiency of field digitizing and data collection.
- Designed to maximize screen real estate
- Provide field scientists with enough GIS capability to make informed decisions *in the field*.
- Digitizing standards are pre-set as the defaults so user does not have to know or understand all the details of these standards

# Six toolbars in one:

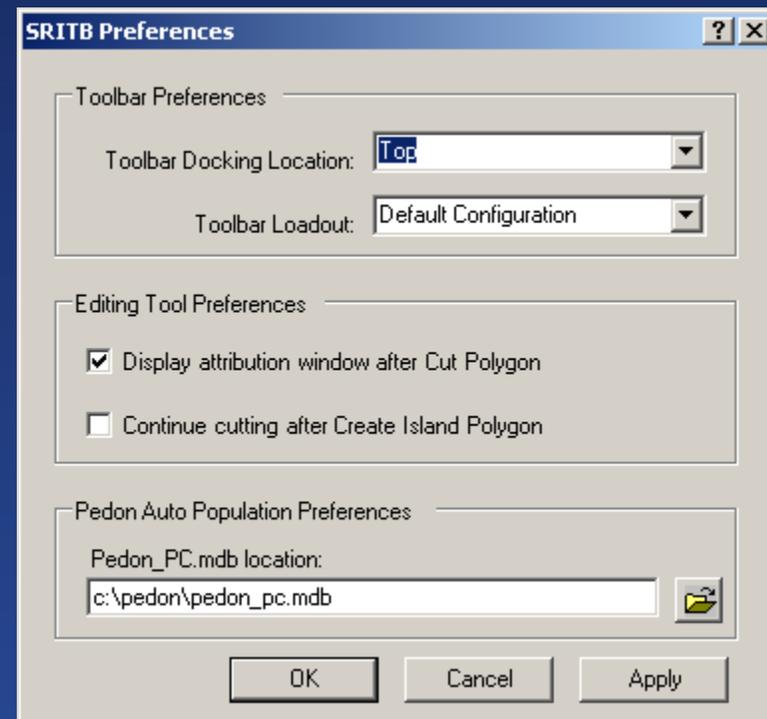
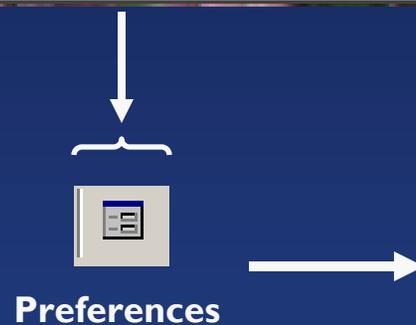
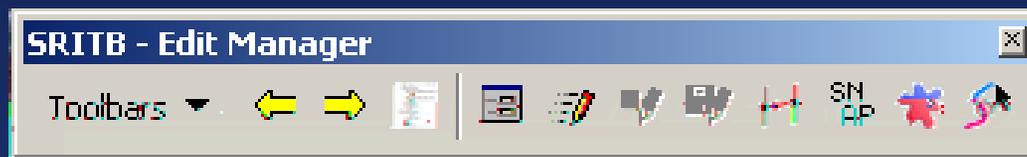


# Tools common to all toolbars:



The Toolbars, Previous, Next, and TOC (Table of Contents) Tools/icons are displayed on all edit toolbars.

# Edit Manager (preferences settings)



# Edit Manager

Editor icons



# Edit Manager

Tolerance Settings icons



Snapping environment



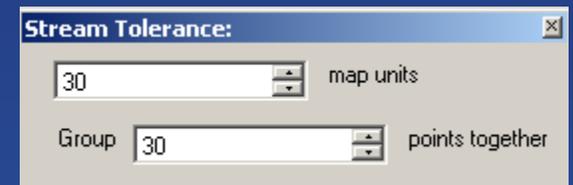
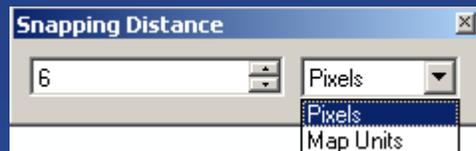
Set Snapping Distance



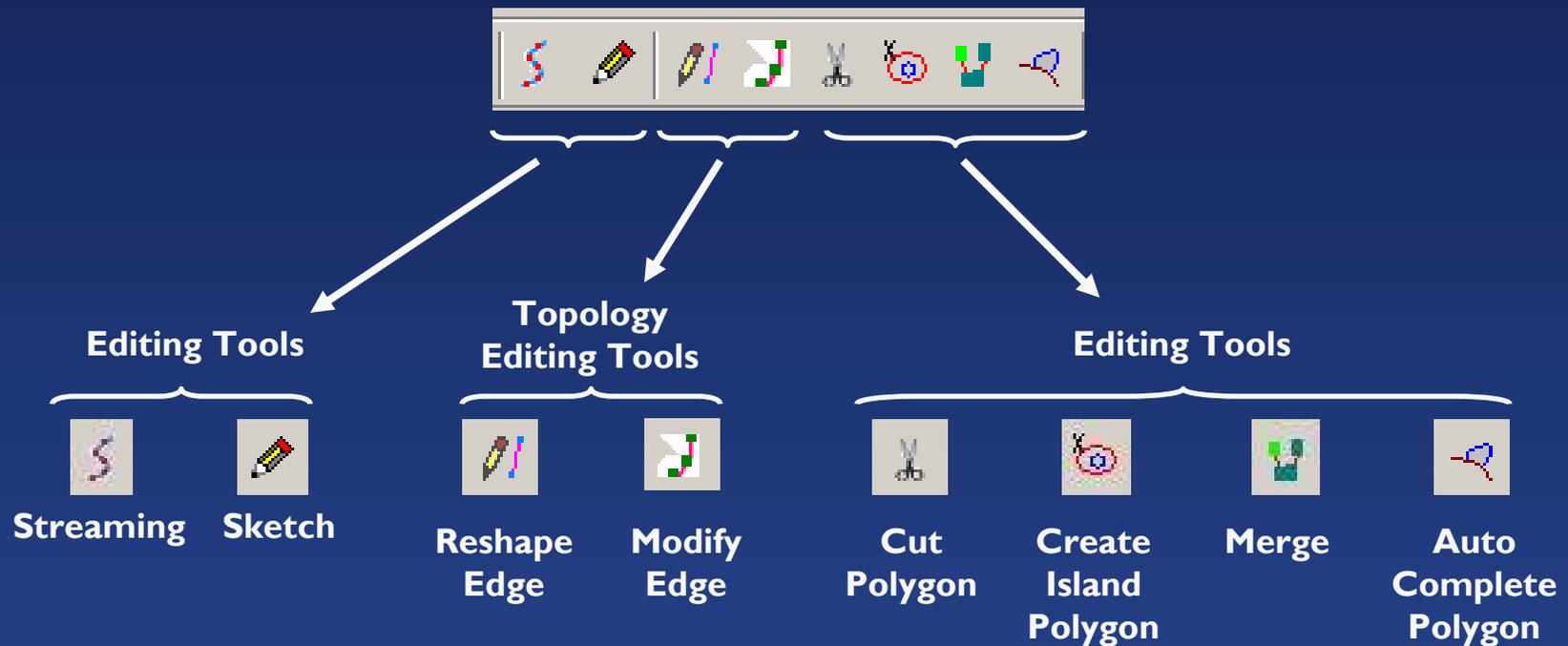
Set Sticky Move Tolerance



Set Stream Tolerance



# Edit Toolbar



# Sketch Toolbar



Draw using  
a Thin pen



Add  
Ink



Erase  
Ink



Finish Ink  
Sketch



Clear Ink  
Sketch



Undo



Ink Settings

# Topology Toolbar



**Construct  
Features**



**Planarize  
Lines**



**Topology  
Edit**



**Show  
Shared  
Features**



**Validate  
Topology  
In Specified  
Area**



**Validate  
Topology  
In Current  
Extent**



**Validate  
Entire  
Topology**

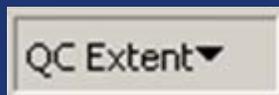


**Fix  
Topology  
Error**

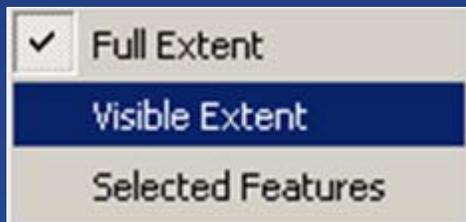


**Error  
Inspector**

# QC Toolbar



Extent Selection



Find And Fix Inspector  
????



Finds Minimum Sized Polygons



Finds Common Lines

# GPS Toolbar



## Pedon PC Applications



**Auto-Populate From Current GPS Position**



**Auto-Populate From Selected points**



**Auto-Populate From Clicked location**



**Connects GPS to Application**



**Displays GPS Position On Screen**



**Information On GPS Receiver**



**Navigation Using GPS**

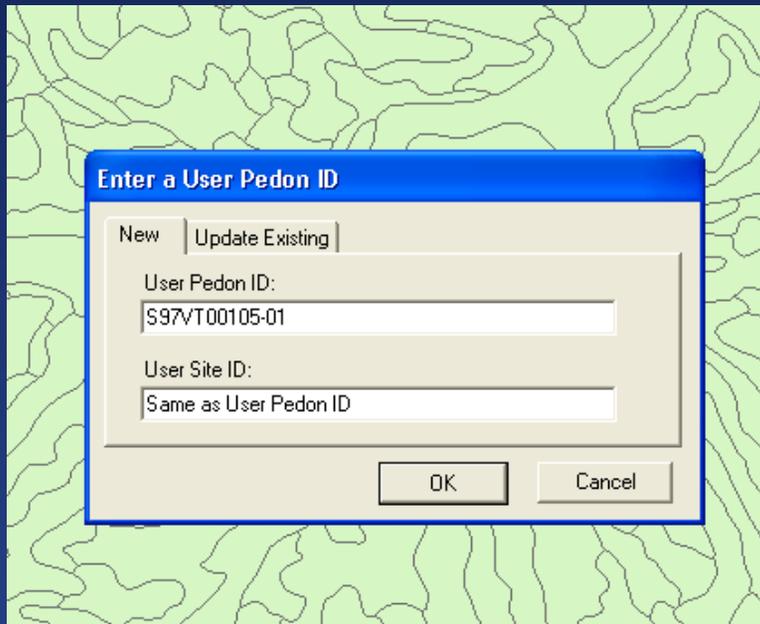


**Collect Point**



**Close Connection**

# Auto population of Location



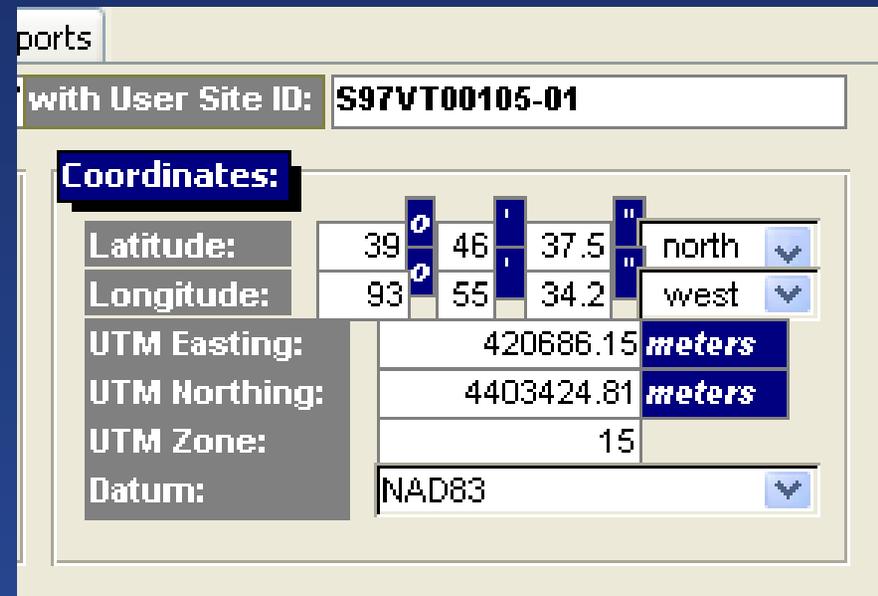
Enter a User Pedon ID

New | Update Existing

User Pedon ID:  
S97VT00105-01

User Site ID:  
Same as User Pedon ID

OK Cancel



ports

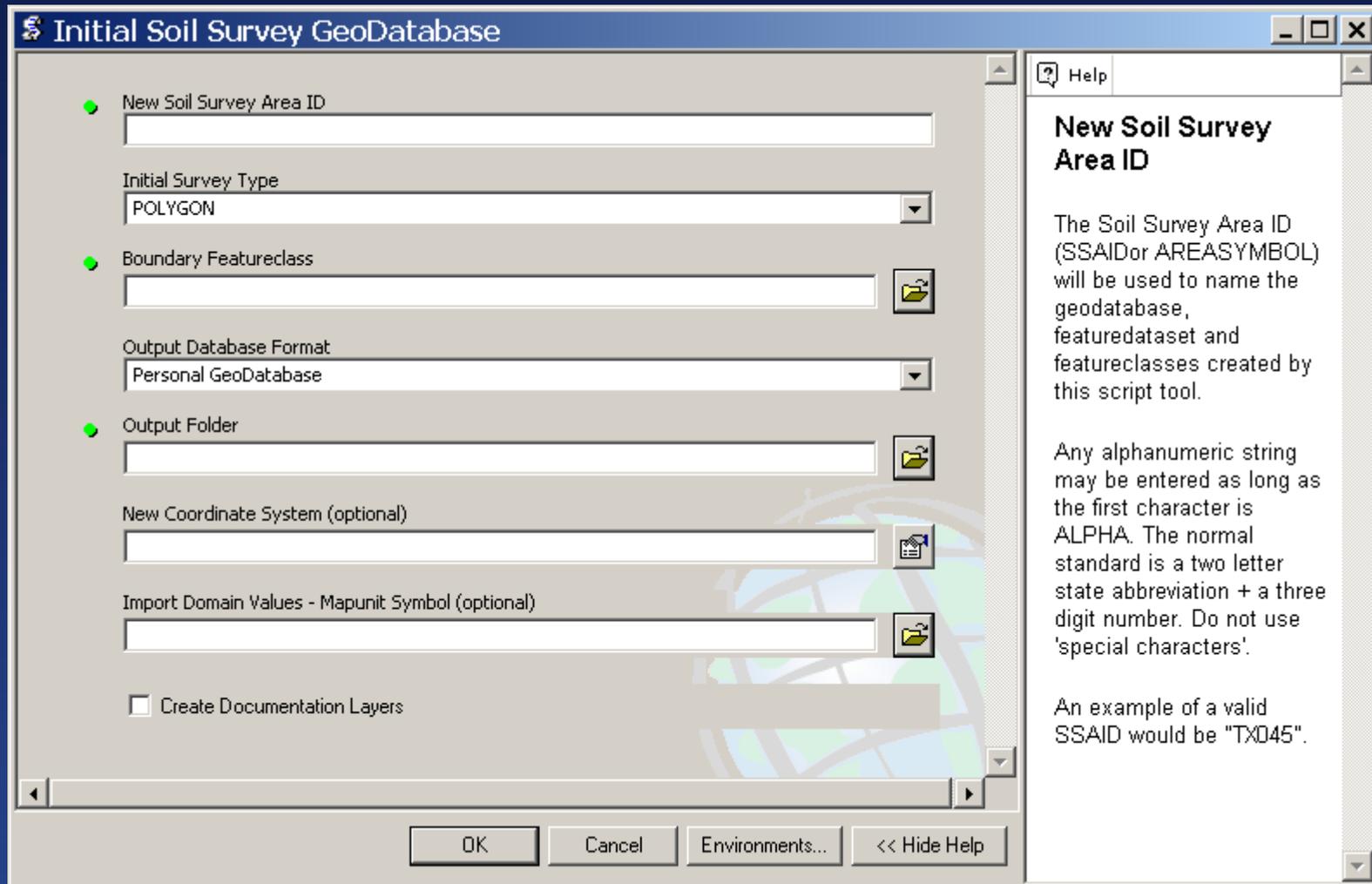
with User Site ID: S97VT00105-01

**Coordinates:**

Latitude:	39	46	37.5	north
Longitude:	93	55	34.2	west
UTM Easting:	420686.15			meters
UTM Northing:	4403424.81			meters
UTM Zone:	15			
Datum:	NAD83			

# Setup Tools

- Proper setup is critical to data quality
- Setup Toolboxes simplify and bullet-proof setup and offer standardization
- Two Options - initial or update survey
- Options within options for different types of setup
- Packaged separately from SRITB



The screenshot shows a software dialog box titled "Initial Soil Survey GeoDatabase". It contains several input fields and options:

- New Soil Survey Area ID:** An empty text input field.
- Initial Survey Type:** A dropdown menu with "POLYGON" selected.
- Boundary Featureclass:** An empty text input field with a folder icon to its right.
- Output Database Format:** A dropdown menu with "Personal GeoDatabase" selected.
- Output Folder:** An empty text input field with a folder icon to its right.
- New Coordinate System (optional):** An empty text input field with a folder icon to its right.
- Import Domain Values - Mapunit Symbol (optional):** An empty text input field with a folder icon to its right.
- Create Documentation Layers**

At the bottom of the dialog are buttons for "OK", "Cancel", "Environments...", and "<< Hide Help".

A help window is open on the right side of the dialog, titled "New Soil Survey Area ID". It contains the following text:

**New Soil Survey Area ID**

The Soil Survey Area ID (SSAID or AREASYMBOL) will be used to name the geodatabase, featurdataset and featureclasses created by this script tool.

Any alphanumeric string may be entered as long as the first character is ALPHA. The normal standard is a two letter state abbreviation + a three digit number. Do not use 'special characters'.

An example of a valid SSAID would be "TX045".





MyToolbar

Setup...

Setup

Pedon PC	C:\pedon\pedon_pc.mdb	Edit...
Analysis PC	C:\analysis\analysis_pc.mdb	Edit...
ArcMap	C:\analysis\analysis.mxd	Edit...
NASIS	https://nasicitrix.sc.egov.usda.gov/Citrix/MetaFrame/default/default.aspx	Edit...
OSDs	http://soils.usda.gov/technical/classification/osd/index.html	Edit...
Laboratory Data	http://soils.usda.gov/survey/nscd/	Edit...
Technical References	http://soils.usda.gov/technical/	Edit...
Series Extent Mapping Tool	http://www.cei.psu.edu/soiltool/semtool_phase2.html	Edit...
Geospatial Data Gateway	http://datagateway.nrcs.usda.gov	Edit...
Soil Data Mart	http://soildatamart.nrcs.usda.gov	Edit...
Web Soil Survey	http://websoilsurvey.nrcs.usda.gov	Edit...
Soil's Page	http://www.soils.usda.gov	Edit...
Training	http://www.soils.usda.gov/education/training/	Edit...
My NRCS	http://my.nrcs.usda.gov/nrcs.aspx	Edit...
SBAAG	http://www.soils.usda.gov/partnerships/sbaag/	Edit...
COLAB	https://colab.sc.egov.usda.gov/	Edit...
NRCS Home Page	http://www.nrcs.usda.gov/	Edit...

Save Cancel



# Questions?