Identify potential new technologies to support field activities in the processing of existing digital spatial data.

a) GIS Analysis to improve initial and update project soil survey.

I) Pedon point data spatially joined to mapunit polygons, preprocessed and ready for use in correlation.

II) Geostatistical tool for analysis of pedon description and laboratory analysis results to determine mapunit composition, distribution, and extent.

Identify potential new technologies to support field activities in the processing of existing digital spatial data.

a) GIS Analysis to improve initial and update project soil survey.

III) Automated process models to produce primary and secondary terrain derivatives from multiple resolution (LIDAR, IFSAR, hypsographic) elevation raster datasets. Be able to perform analysis in office and on-site.

IV) NCSS cooperators should take an active role in submitting proposals for multi-entity acquisitions of high resolution elevation data (LIDAR, IFSAR) and other remote sensing products.

Identify potential new technologies to support field activities in the processing of existing digital spatial data.

b) Extend Soil Data Mart and Soil Data Viewer functionality to work with File and Enterprise Geodatabase vector and raster formats to enable larger areas including Series Extent mapping functions. Soil spatial data is delivered ready to use with tabular data already incorporated in the file geodatabase.

c) Acquire improved ruggedized equipment for field data collection, including mobile computers and digital cameras with integrated GPS.

d) Acquire improved computer hardware for high capacity data storage with increased security and integrity.

Identify new technologies and methodologies that can support and/or enhance digital soil survey activities.

a) Apply SCORPAN (Soil Climate Organism, Relief, Parent Material, Age, Geographic Location, based on statiscal/geostatistical models) or knowledge based mapping in GIS environment.

I) Derive continuous layers of soil properties for input into model in adherence to spatial reference standards.

II) Continual update/regeneration of soil property layers with new observations.implementation.

Identify new technologies and methodologies that can support and/or enhance digital soil survey activities.

b) Monitoring and data collection.

I) On-site in-situ environmental data collection, including but not limited to water table, air temperature, soil temperature and soil moisture.

II) Utilize new sensors such as VNIR, EC, moisture, resistance. Collect concurrently with high precision/high accuracy GPS. Acquire software for spectrometry data processing (MARS, Unscramble) and statistical analysis (Classification and Regression Tree CART).

III) Optimize data collection with automated data loggers both mobile sensors and stationary monitoring sites.

IV) Develop strategy for upload to a central repository, database model, and incorporation into existing soil database structure.

Identify new technologies and methodologies that can support and/or enhance digital soil survey activities.

b) Monitoring and data collection.

III) Optimize data collection with automated data loggers both mobile sensors and stationary monitoring sites.

IV) Develop strategy for upload to a central repository, database model, and incorporation into existing soil database structure.

c) Create a spectral library for VNIR calibration.

d) Develop pedotransfer functions for alignment of new and legacy soil laboratory analysis datasets.

3 and 4. Identify customers who require soil property maps. Identify the need for soil property maps, the required map scales for soil property maps and what soil properties to map

Customers	Content	Scale
Meteorological modelers (crop models, global change, soil carbon, etc.)	-%sand, %silt, %clay -rock fragment content Layer depths, 3D model Available water capacity Rooting depth Bulk Density Soil organic carbon Soil inorganic carbon Total carbon And other related layers	1:12,000, 10m 1:24,000, 30m 1:250,000, 90m –1km
Farm Service Agency	soil crop productivity indices	1:12,000, 10m 1:24,000, 30m
Land developers Reclamation/remediation officials	Land capability class Infiltration Rate	1:12,000, 10m 1:24,000, 30m

5. Investigate ways and propose methods to provide end users with accuracy measurements for soil maps.

Current Product

Cartography/Visual Method		Tabular/Text
Variance maps		Fuzzy Logic
Visualization of component locations in map unit.		Coefficient of Variance (CV) values and Standard Deviation for individual map units and soil properties in the attribute table. Regression coefficient R^2 , Mean Prediction Error, Root Mean Square Error.
Map unit boundary distinctness		Number of pedons (measurements, lab data) per soil used to make estimat
Interpretation- Utilize Decision Support System		Date of soil survey completion.
		Date of soil sample collection.

Current Product

5. Investigate ways and propose methods to provide end users with accuracy measurements for soil maps.

Next Generation Product (SOLA, Soil Grid, Soil Pixel, Soil Voxel, SOLA Vox)

Cartography/Visual Method		Tabular/Text
Multi-temporal behavior – El Nino and La Nina performance of soil landscapes within MLRA		Database record of all point observations.
Spatial database record of all point observations.		
3D soil-landscape models		
Space-time models and maps		
Disaggregation of map unit components (defuzzifying)		