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| *Soil Health and Dynamic Soil Properties Database* |
| **High Level Business Requirements Specification** |
| Office of the Chief Information Officer  Natural Resources Conservation Service  Washington, D.C.  Completion target:  5/1/2017  Version 1.0 |

**Revision History**

| Version | Implemented By | Revision Date | Approved By | Approval Date | Description of Change |
| --- | --- | --- | --- | --- | --- |
| 1.0 | Skye Wills | 5/1/2017 |  |  | Initial Version |
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**Project Contacts**

| Name | Title | Project Role |
| --- | --- | --- |
| Dave Hoover |  |  |
| Drew Kinney (acting) | National Leader, Soil Business Systems | Business Liaison |
|  | IT Project Manager | Project Manager |
| Skye Wills | Soil Scientist | Subject Matter Expert |
| Dana Ashford-Kornburger | National Nutrient Management Specialist | Subject Matter Expert |
| Jennifer Moore Kucera | West Regional Soil Health Team Leader | Subject Matter Expert |

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# Requirements Document Approval

The undersigned acknowledge that they have reviewed this High Level Business Requirements (HLBR) Specification document and agree with the information presented within this document. Changes to this Requirement Specification document will be coordinated with, and approved by, the undersigned or their designated representatives.

Project Name: Web Soil Survey 2015 Enhancements

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| --- | --- | --- | --- |
| Signature: |  | Date: |  |
| Print Name: |  |  |  |
| Title: | IT Project Manager |  |  |
| Role: | Project Manager |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Signature: |  | Date: |  |
| Print Name: | David Hoover |  |  |
| Title: | National Leader for Soil Business Systems |  |  |
| Role: | Business Liaison |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Signature: |  | Date: |  |
| Print Name: | David Smith |  |  |
| Title: | Deputy Chief, SSRA |  |  |
| Role: | Business Sponsor |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Signature: |  | Date: |  |
| Print Name: |  |  |  |
| Title: |  |  |  |
| Role: | Executive Sponsor |  |  |

# Overview

## *Purpose*

The purpose of this document is to define the high-level business requirements for a Dynamic Soil Properties Database, which includes functionality for soil health (including soil biology), agronomic management and technical soil service activities. This will give the Investment ReviewBoard the information necessary to prioritize and approve the project for funding.

From Soil Health and NRCS Soil Science Division issue paper:

## *Many different universities, agencies and private entities are preforming analysis to assess soil health or soil biological attribute data, there is an urgent need for the Soil Science Division to provide leadership on vetting the methods of analysis and standardizing the protocols for sampling. There is also an urgent need for the soil biological attribute data to be added to a national database.*

## *The legislated soil survey mission from 1967 is to inventory the soil resources of the United States, maintain the soil inventory, make interpretations for soil and land use, and provide technical assistance to landowners, municipalities, agencies, and others who manage the soils resource. The soil survey has done a very good job in collecting the physical and chemical properties of soils and managing the data in a national database (NASIS). The physical and chemical properties of soils are just two of the major property groups that make up soils. The third and much needed property group, which was not collected during the soil survey and is not in the database is the biological properties group. We will never fully understand soils and be able to manage the resource well, until we have collected the biological data and understand the relationships that exist between the physical, chemical, and biological soil properties.*

## *Scope*

The scope of this project is to provide high-level requirements for a national Soil Health and Dynamic Soil Properties Database which includes options for internal and external use. As well as functions to enter (manually or via import from other databases), store, access, and export data, information, and reports published for public use.

### In Scope

In-scope items to be included are:

* All producers and users of soil health and dynamic soil property data and information should have access to the database.
  + NRCS employees and technical services providers, universities, state and local governments, and private individuals.
  + Levels of access and authentication will be variable for the transactional portion of the database (may require curation from a database manager)
  + Export or published data, information, and reports will be publicly available without authentication.
* Development of new user interfaces, web services, and data delivery systems, or enhancement of existing interfaces, web services, and delivery systems (e.g. WSS, Soil Data Access).
* Associations and linkages required to current corporate databases and applicable assessment tools including soil (e.g. NASIS, and/or ESIS) and conservation [e.g. LMOD, IET (RUSLE2/WEPP and WEPS), CEAP models etc.]
* Development of interfaces with external data. (e.g. DigiTop Open File Reports, USDA-ARS, USGS, USFS, SHD, and/or university partners)
* Development of citizen science input and output options.

### Out of Scope

The following are out of scope:

* Exsisting soil survey databases

## Risks and Dependencies

### Risks

The major risks to the business requirements for a soil health and dynamic soil properties database are listed below.

* Funding and resources for this project could be uncertain.
  + Developers are needed to build and deploy a database available across a wide range and users.
  + Database managers are needed to curate and maintain database structures
  + Subject matter experts are needed to define necessary tables, fields and data units in the database.
* Changing business requirements and resulting programming.
  + Database may need to change to meet new policy, hardware and software needs.
* Data fields are changed or updated in linked databases and tools.
  + Technical improvements in the state of soil health and soil science will require database adjustments and modifications.

### Dependencies

The major dependencies for the business requirements of a soil health and dynamic soil properties database are listed below:

* Interface with existing database structure(s).
* Existing database delivery mechanisms. (WSS, NASIS, and/or ESIS)

## Intended Audience

* Users of a soil health and dynamic soil property database include NRCS employees and technical services providers, National Cooperative Soil Survey cooperators (e.g. universities, state and local governments, non-government organizations, and other federal agencies) and othe interested individuals. Authentication will likely be required for some portion of intended audience.
* The published/accessible database will have the same user base, but no level will require authentication.

# High Level Business Requirements

## User Interface Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **2.1** | **User Interface** | **Required?** | **Priority** |
| 2.1.1 | Project information  Include purpose of effort, design of sampling or observation  Multi –scale hierarchy of field, map unit and sample location information (both spatially and conceptually)  Include linkages to corporate databases for map units and ecological sites (such as NASIS) and conservation practices and modeling (LMOD, IET) | YES |  |
| 2.1.2 | Management information  Include current and historical management operations using current corporate database (such as LMOD)  Include options for regional and local climate and weather information | YES |  |
| 2.1.3 | Individual Sampling Units (Point Data)  Include location information including GPS coordinates and depth information based both of depth intervals and genetic horizons (could potentially link to genetic horizon in NASIS)  Include time and date information including local conditions, seasonal climate differences (conditional outside of “typical”, “normal”, “historical” ranges), moisture status, etc.  Include option for element selection (properties, methods, observations and techniques will have multiple, modular inputs and require multi-level relational databases with point measurements). Types of data that will be accomadated:   * Method metadata (include choice lists and options for new method entry) * Monitoring data (temporal replication from yearly to hourly intervals) | YES |  |
| 2.1.4 | Calculated/derived fields  Include capacity to use inputs of multiple data elements to produce results in relevant units. | YES |  |
| 2.1.5 | Aggregated Data and Information  Include capacity to aggregate and report data elements according to spatial and project design elements.  Aggregation should have both an automated (preferred) technique and be customizable through user input (2.1.6) | YES |  |
| 2.1.6 | Output/export through multiple interfaces  Include dynamic soil property elements through exsisting data sharing portals (e.g. Soil Data Access).  Include options that allow the user to adjust calculation and aggregation scheme. |  |  |
| 2.1.7 | Integrate with existing databases  Previous elements require a robust, modular metadata structure and data dictionary. Elements in or associated with the dynamic soil properties database need to be compatible with existing databases. (e.g. NASIS, ESIS, etc.) Allowing for this type of functionality may require an adhoc or similar strategy for the associated domain(s) or data dictionary.  It maybe reasonable to consider a transactional GUI that will interface with and populate multiple databases simultaneously | YES |  |

## External Interface Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **2.2** | **External Integrations** | **Required?** | **Priority** |
| 2.2.1 | Import from external database/source |  |  |
| 2.2.2 | Manage User Inputs Directly |  |  |
| 2.2.3 | Export to delivery system |  |  |

## Reporting Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **2.3** | **Reporting** | **Required?** | **Priority** |
| 2.3.1 | Tabular data |  |  |
| 2.3.2 | Interpretations |  |  |

# Non-Functional Requirements

This section identifies known business requirements related to non-functional areas such as general Design Constraints and technical areas. Because this documentation is a product of the Business Requirements phase of the project, not all technical and design constraint requirements will be known at this time, but many will be defined within the Design and Development phases of the project. All specific business related requirements known at the time of the generation of this documentation are included here.

## Design Constraints

The following subsection lists a number of qualities that, if approached properly can provide for a well-designed and effectively implemented software solution. When these qualities are built into the application it can provide for a much more efficient, reliable and easy to use solution. This subsection includes general design constraints.

|  |  |  |  |
| --- | --- | --- | --- |
| **3.1** |  | **Required?** | **Priority** |
|  |  |  |  |

## Maintainability Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **3.2** |  | **Required?** | **Priority** |
| 3.2.1 |  |  |  |

## Software Requirements

## Interface Requirements

## Security and Privacy Requirements

### Security Requirements

* User authentication is required.

### PII Requirements

* Requirements for this project do not include any PII data.??

## Compliance and Standards

### Compliance

* The design of this project shall be done in compliance with Section 508 Product Assessment requirements.

## Requirements Traceability Checklist

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# Appendix A – Acronyms, Terms and Definitions

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| **Acronyms and Terms** | **Definitions** |
|  |  |
|  |  |
|  |  |
| CEAP | Conservation Effects Assessment Project |
| ESIS | Ecological Site Information System |
|  |  |
|  |  |
| GPS | Global Positioning System |
| GUI | Graphical User Interface |
| HLBR | High Level Business Requirement |
| IET | Integrated Erosion Tool |
|  |  |
| IT | Information Technology |
| LMOD | Land Management and Operations Database |
| NASIS | National Soil Information System |
| NRCS | Natural Resources Conservation Service |
| PII | Personally Identifiable Information |
| RUSLE2 | Revised Universal Soil Loss Equation, Version 2 |
| SDM | Soil Data Mart |
| SHD | Soil Health Division |
| WEPP | Water Erosion Prediction Project |
| WEPS | Wind Erosion Prediction System |
| WSS | Web Soil Survey |
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