Integrating Conservation Tools and Models with OMS and Remote Smart-Phone Apps.

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https://nrcs.sc.egov.usda.gov/spa/streamline
Five Streamlining Initiatives

1. Streamlined & Integrated Business Processes

2. Well-Aligned Information Technology


4. Alternative FA Staffing & Delivery Approaches

5. Client-Focused Products & Services

Focusing On:

**INITIATIVE 3**
Provide field technical staff with natural resource science and technology focused to support conservation planning and application

[Link](https://nrcs.sc.egov.usda.gov/spa/streamline)
Current State:

- 279 science tools (difficult to manage and utilize) and databases
- Existing tools are stove piped
  - Stand-alone (i.e. non-integrated applications)
  - Stand-alone, duplicative, stale data
- Applications are NOT designed for Mobile Environment
- Non-Alignment with Business Process
  - Disconnected from the planning process

Example Tools

- 3d Mapper
- AfoPro
- AnnAGNPS
- AgPipe
- AGWA
- APEX
- Arc Hydro Tools
- ArcSWAT
- AR Soil Char. DB
- AWM
- Bank Profile
- Basin and Border
- BASINS
...
Desired Future State

Integrated science/models in support of the planning process.

- Identify and assess resource concerns
- Address resource concerns as a part of formulating alternatives

NRCS Nine Steps of Planning

Phase I - Collection and Analysis
1. Identify Problems and Opportunities
2. Determine Objectives
3. Inventory Resources
4. Analyze Resource Data

Phase II - Decision Support
5. Formulate Alternatives
6. Evaluate Alternatives
7. Make Decisions

Phase III - Application and Evaluation
8. Implement the Plan
9. Evaluate the Plan

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Overview for Integrated Technology

Version One Tools

- RUSLE2
- WEPS
- GRAS
- APEX
- Tech. Worksheets
Short Term Strategy
Resource Assessment
• Ask Screening Questions
• Use Assessments tools (RUSLE2, WEPS, Tech. Worksheets.)

Alternative Formulation:
• Utilize CPPE to evaluate alternatives
Long Term Strategy

Resource Assessment:
• Utilize more science based tools for assessment.

Alternative Formulation:
• Utilize models like APEX and other tools to evaluate system effects.

Area Wide Planning:
• Utilize resource concern prioritization from Area Wide Planning
Long Term Strategy
Outcome Based:
• Utilize science to support reporting outcomes.

Conservation Effects Statement

Client Name: Farmer Brown   Plan Date: 11/18/2009
Tract Number: 1234                Fields: 1, 2, 3, 4, 5, 6
Objective: To reduce soil erosion while increasing grain production yields.

Soil Erosion

Erosion rates on a per acre basis declined significantly between the benchmark and planned system. Water (sheet & rill) erosion on cropland dropped from 12.4 tons per acre per year to 3.2 tons per acre per year; wind erosion rates were not a resource concern for this plan.

Nutrient Transport

Nitrate concentrations are holding steady, in contrast to an earlier upward trend. Point source discharges continue to rise as population and wastewater flows increase. Further reduction in nutrients will be achieved largely by improving nutrient management and controlling erosion and sediment on farmland.

Carbon Sequestration

Carbon uptake on cropland will increase 14 percent between 2010 and 2035. This trend is a function of increased carbon uptake from conservation tillage operations. Continued use of conservation tillage over the next 25 years will result in the 1.9 Tg CO2 sequestered.
Proposed IT Architecture

Conservation Delivery Streamlining Initiative

Conservation Desktop UI

Science Tools
Rusle2
Weps
APEX
GRAS
...

Non-NRCS Users UIs

Science Tools
Rusle2
Weps
APEX
GRAS
...

Natural Resource Data
Soil Data
Climate Data

Land Management Operation Database

Mgt. Templates
Operation Attribute Data
Fertilizer Attribute Data
Pesticide Attribute Data

Object Modeling System

Computational Engines
RUSLE2
WEPS
SCI
STIR

Internet

LMOD Web Services

Science Tools
Rusle2
Weps
APEX
GRAS
...

Non-NRCS Users UIs

Science Tools
Rusle2
Weps
APEX
GRAS
...
RUSLE2 Android Mobil App

- Runs the cloud based OMS3/Rusle2 Webservice
- Cloud based data management
- GPS enabled
- USGS elevation Webservice
RUSLE2 Mobile Workflow

- **Manual Parameter Selection**
- **Transect Definition**
  - USGS Elevation service
- **Location based Management Selection**
- **Remote Model Execution of Rusle 2 in CSIP/OMS3**
- **Model Results**

**Conservation Delivery Streamlining Initiative**

**RUSLE2 Mobile Workflow**

**INPUT**
- Climate
- Soils
- Management
- Length
- Steepness

**OUTPUT**
- L-value
- Degradation
- Slope