Conservation Planning

Steve Barker, Resource Management Systems LLC
Overview

- What is a conservation plan
- Conservation Districts
- The NRCS 9 step planning process
- First Nations support for Tribal producers
NRCS Conservation Plan

TUCSON PLANT MATERIALS CENTER
3241 N ROMERO RD
TUCSON, AZ 85705

Conservation Plan

Access Road
An access road will be upgraded for dust control as part of a conservation management system to reduce dust along the main road on the west side of fields 1 and 3 and along the access road between fields 1 and 3. An ABC gravel treatment will be applied. The access road will be installed according to NRCS provided specifications. With proper operation and maintenance, the expected lifespan of this practice is 10 years.

<table>
<thead>
<tr>
<th>Field</th>
<th>Planned Amount</th>
<th>Month</th>
<th>Year</th>
<th>Applied Amount</th>
<th>Date</th>
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<td>12/1/2009</td>
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<td>11</td>
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<td>385 ft</td>
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Conservation Crop Rotation
Conservation Crop Rotation will be applied as part of this Conservation Plan to improve soil quality. The length of the cropping rotation is on average five years. The cropping sequence will be perennial warm season grasses followed by cool and warm season cover crop species. Practice lifespan is 1 year.

<table>
<thead>
<tr>
<th>Field</th>
<th>Planned Amount</th>
<th>Month</th>
<th>Year</th>
<th>Applied Amount</th>
<th>Date</th>
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<tbody>
<tr>
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<td>3 ac</td>
<td>3/1/2011</td>
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<td>34.9 ac</td>
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</table>
Conservation Plan Approval Signatures

- The farmer or rancher
- An NRCS Certified Conservation Planner
- The Conservation District

- **Coordinated Resource Management Plans** are written documents signed by all participants.
SOME BASIC PRINCIPLES OF CONSERVATION PLANNING
Conservation planning is the fundamental starting point for maintaining and improving the natural resources that support productive and profitable agricultural operations.
A conservation plan is simply a record of the land user’s decisions about the conservation practices that they plan to apply on their land to address resource problems and ensure sustainable land use.
The objectives for conservation planning are to:

- attain sound management of the soil, water, air, plant, and animal resources
- ensure the long term sustained use and productivity of our working landscapes
- while considering the management and economic needs for maintaining viable agricultural production
Conservation planning is designed to assure:

Quality of our natural resources for sustained use;

Quality in the environment to provide attractive, convenient, and satisfying places to live, work, and play; and

Quality in the standard of living based on community improvement and adequate income.
Conservation planning is also intended to help farmers and ranchers comply with a variety of environmental regulations:

- Clean Water Act
- Clean Air Act
- Endangered Species Act
- State laws
- Tribal laws
Farmers and ranchers care about conserving the natural resources for future generations.

Those who live and work on the land ensure sustained use of the land.
Most of our knowledge about how to manage land is learned from farmers and ranchers who apply conservation plans on their lands.
Every farm and ranch has unique natural resources and unique management challenges.
TECHNICAL ASSISTANCE THROUGH CONSERVATION DISTRICTS
Conservation Districts, formed under authority of State and Tribal laws, are operated and controlled by elected and appointed local land owners.

Conservation Districts provide the leadership for a locally led conservation program to help land users address local conservation priorities.
Farmers and ranchers have established over 3000 Conservation Districts all across the United States to encourage sound use and management of the natural resources that support productive and profitable agricultural operations.

They enter into an agreements with the Secretary of Agriculture and other agencies to obtain technical assistance for their farmers and ranchers.
Conservation Districts can help producers get conservation planning and application assistance from NRCS and other agencies.

Conservation planning is our core business.
NRCS and other agencies are there to help you develop and implement your conservation plan.

On-site visits by the agencies are an integral part of conservation planning assistance.

The farmer or rancher must be engaged in every step of the planning process – it must be their plan.
Getting Agency and University Support

The farmer or rancher develops a better understanding of
- their soils and other natural resources
- the condition of the resources on their land
- other resource issues in the area that they may impact
- The conservation practices that can be used in resource management system

The agency specialists develop a better understanding of
- How the land is managed to produce agricultural products
- Special needs and challenges of the crops and livestock being produced
- Pass on success stories to other producers
The practical experience of farmers and ranchers

- is combined with the local priorities of the Conservation District
- and the scientific knowledge and skills of agency specialists
- to develop and implement the client’s conservation plan
- that ensures sustainable working landscapes
- and helps land users comply with environmental regulations.
NRCS Definitions

Resource Management System (RMS)

- The combination of conservation practices needed to address all of the resource concerns for soil, water, air, plants, and animals, to maintain the resources in good condition.
- And.. meet the goals and objectives of the producer
NRCS Definitions

- **Quality Criteria** - A desired treatment level or condition for the soil, water, air, and plant resources.
1. Identify Problems and Opportunities
2. Determine Objectives
3. Inventory Resources
4. Analyze Resource Data
5. Formulate Alternatives
6. Evaluate Alternatives
7. Make Decisions
8. Implement the Plan
9. Evaluate the Plan

Although the nine steps are shown in sequence, the process is very dynamic.
NRCS Phases of Conservation Planning

Planning Process

I. Collection & Analysis

II. Decision Support

III. Application & Evaluation

Identify Problems

Inventory Resources

Analyse Resource Data

Determine Objectives

Formulate Alternatives

Evaluate Alternatives

Make Decisions

Implement the Plan

Evaluate the Plan
A conservation plan does not need to include the entire operation, but it should include all of the lands that need to be logically planned and managed together as a unit.

For example, the conservation plan should include all of the pastures that will be used together in a grazing rotation.

On cropland, all fields that depend on one irrigation well would logically be planned together.
Pre-Planning Activities

- Identify the decision makers (producers, land owners, agencies, etc.)
- Identify the operation boundaries
- Get any existing maps, surveys, and other information available from the Tribe, agencies, Conservation Districts, universities.
- **Soil Maps and Descriptions**

  - A soils map is essential for all conservation plans.
  - An ecological site map is also essential for rangeland, forest, and wildlife lands.
  - Develop other soil interpretation maps as needed for the area being planned.
Pre-Planning Activities

- Assemble soil and vegetation maps
- Review soil descriptions and soil interpretations

Web Soil Survey
http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm
If there are multiple ownerships, a land status map should be provided. The land status map should identify the land status categories shown below as appropriate:

- Private owned
- Private lease
- State Trust
- BLM
- National Forest
- Tribal trust
- Tribal allotted
- Other lease
- Uncontrolled
Conservation Planning Phase I

- Identify Problems
- Developing Goals and Objectives
- Inventory Resources – collect information to evaluate of the current condition of the soil, water, air, plant, animal, and energy resources
- Past treatments
- Existing structural improvements
- Existing management
Step 1: Identify Problems and Opportunities

The conservation planning process normally begins when the land user identifies problems or opportunities:

- soil erosion
- poor irrigation efficiency
- inadequate water for livestock
- dust problems
- energy use on their operation
A system of numbering is needed to connect things marked on the map with information about that item in the planning workbook.

- W# - Well number
- E# - Earth dam or pond number
- C# - Catchment number
- S# - Storage tank number
- T# - Trough number
- SP# - Spring number
- RP# - Perennial stream or river number
- RS# - Seasonal stream or river number
- H# - Housing/residential area number
Step 2: Determine Goals and Objectives

**Description of the Operation**
A brief narrative description of the operation, including the general location information, size, natural resources, land uses being managed, and kinds of products produced.

**Goals**
Ecological, economic, and social goals for the conservation plan. The ecological goals include the specific resource concerns that you want to address in their conservation plan.

**Objectives**
Objectives are measurable steps that will be taken to achieve the goals of the conservation plan.
Ecological Goals (Examples)

- Maintain or improve native plant productivity on rangeland
- Slow the flow to minimize runoff
- Capture the maximum amount of rain on the watershed
- Have more water in ponds and streams
- Improve grazing management
- Maintain good vegetation cover
- Control shrubs in areas where there are too many
- Control noxious weeds
- Protect water rights
- Identify and conserve native food and ceremonial plans
- Control erosion
- Bring back desirable wildlife
- Manage undesirable wildlife
Economic Goals (Examples)

- Continue to produce beef
- Have healthy livestock
- Run the livestock operation more like a business.
- Have a profitable business.
- Better manage the income from livestock
- Purchase off reservation areas for grass banking
- Lease off reservation areas when needed during drought years
Community Goals (Examples)

- Provide rancher and youth education and training
- Provide locally grown food for the community
- Reduce dust
- Reduce flooding
Step 3: Inventory Resources

- Gather needed management information about the operation.
- Inventory the soil, water, air, plant and animal resources for the land being planned.
- At each sample site location, collect the inventory data appropriate for the land use. GPS the inventory locations.
Pre-Planning Activities

- Identify tools or supplies needed for the inventory.
  - Tapes
  - Clippers
  - Scales
  - Maps
  - GPS
  - Shovel
  - Acid bottle
  - pH meter
  - Plant ID books
What Needs to Be Inventoried

- Considerations
  - Client’s objectives
  - Observations by the planner and client
  - Professional judgment
  - Legal requirements
  - Program requirements
  - Common sense
  - The findings from the inventory, as it unfolds
Some Benchmark Items

- Crop rotation
- Planting dates
- Yields
- Nutrient management
- Soil testing
- Pest management
- Irrigation management
- Economics
- Grazing system used
- Forage production
- Forage demand
- Wildlife Habitat
- T&E Species
- Cultural Resources
- Quality Criteria
- Other Planning considerations
A BENCHMARK INVENTORY
We Care About Soils

- High priority resource concerns include
  - Soil Erosion
  - Soil Condition
  - Soil Salinity
Soil erosion is evaluated using a variety of tools

- Revised Universal Soil Loss Equation (RUSLE2)
- Wind Erosion Prediction System (WEPS)
- Range Health
- Gully and streambank erosion problems can be documented by taking a picture and measuring the length, depth and width of the eroded area.
Soil compaction can be evaluated using a Dickey John penetrometer.
Management of soil salinity requires an understanding of:

- The crops being grown and their salt tolerance
- The salinity level of the soils
- The salinity level of the irrigation water being applied
- The management of crop residues and organic matter
- The application of soil amendments such as gypsum
We Care About Water Quantity and Water Quality

- High priority resource concerns include
  - Capturing Snow and Rainfall
  - Irrigation Efficiency
  - Pesticides and Nutrients in Surface and Groundwater
  - Sediment in Surface Water
The capture and storage of precipitation from snow and rainfall for rangeland and dry land farming requires careful management of litter or residue cover and soil organic matter.

Farmers may also want to consider:
- contour farming
- row arrangement
- herbaceous wind barriers
- windbreaks
- water harvesting catchments
- other conservation practices
Conservation of irrigation water requires an understanding of:

- Soil water holding capacities and intake rates
- Crop consumptive use requirements
- Source of irrigation water and type and sizes of conveyance systems
- Field configuration, including field lengths, slopes, furrow and border spacing for crops, number and location of field turnouts
- Flow measurement
- Soil moisture monitoring
The role of NRCS in nutrients and pesticide evaluations is to assess and mitigate the risks to the environment. Producers need to know if nutrients are needed for production.

- The risk of surface and water contamination requires an understanding of:
  - kinds, amounts, application methods, and timing of nutrients and pesticides being applied to the land.
  - soils
  - water bodies of concern downstream and groundwater depth.
  - an evaluation of irrigation runoff and leaching amounts
Sediment in surface water from soil erosion affects

- habitat quality for aquatic wildlife
- water quality for wildlife, livestock, and humans
- the storage and flow capacities of ponds and lakes, and water conveyances
We Care About Air Quality

High Priority Resource Concerns include

- Particulate Matter
- Dust
- Odors
Particulate matter from smoke and dust affects human health and the quality of the environment.

- Wildfires
- Prescribed burns
- Crop residue burning
- Road dust
- Construction
- Off road vehicle recreation
- Tillage and harvesting
Dust and odors from dairies and feedlots
We Care About Plants

High Priority Resource Concerns include

- Plant community productivity, composition and structure
Crop and pasture yields

Rangeland and forest production and composition
- Pollinator plants
- Noxious weeds
- Invasive species
Adequate quantity and quality of forage for livestock

Reliable, well distributed water for grazing management
Planning the quality and quantity of forage for livestock requires:

- Inventory of the soils and ecological sites
- Production and composition of current plant communities
- Existing and planned water developments and their reliability
- A forage – animal balance for each pasture
- A water – animal balance for each pasture
- A grazing prescription for each pasture to meet the goals of the conservation plan
The existing water sources, locations, flow rates, storage amounts and reliability

The ecological sites, current plant communities, and desired plant communities

The planned pastures and the prescribed grazing plan.

The timing and location of planned practices such as brush management
We Care About Wildlife

- Priority Resource Concerns include
  - Wildlife Food
  - Wildlife Cover
  - Wildlife Water
  - Habitat Fragmentation
We Care About Energy

Priority Resource Concerns include

- Reducing on-farm energy derived from fossil fuels and improved energy efficiency.
- Assistance to produce renewable energy feedstocks in a sustainable manner.
- Assistance to produce energy from renewable resources to support the application of a conservation practice.”
Other Benchmark Inventory
Information Needed to Develop a Conservation Plan

- Map the location of existing structural practices, and any utilities that may affect conservation plan implementation.

- Map the locations resource concerns
  - Road erosion locations
  - Streambank erosion locations
  - Air quality dust problem areas
  - Animal concentration areas potentially contributing to water quality problems
  - Noxious weed locations
  - Water bodies of concern
- Map the location of existing and historic vegetative practices or treatments
  - Provide any known information about the when and how the area was treated or impacted.

- GPS any existing monitoring locations and/or measurement devices on the benchmark inventory map
Benchmark Inventory Map

- Existing fields, and pastures
- Resource problem areas
- Location of existing structural practices, and any utilities that may affect conservation plan implementation.
- Past treatments
- Direction of water flow for ditches, pipelines, and field irrigation on the benchmark inventory map.
- Inventory and monitoring site locations.
Step 4: Analyze Resource Data

Calculate and summarize all of the results from the inventory to document the current conditions.

- Range Health Assessments
- Wildlife Habitat Evaluation
- Forage and Stock water balance worksheet
- Etc.
Step 4: Analyze Resource Data

- Compare current resource conditions with the desired conditions (quality criteria)
- Compare the current management system with the goals and objectives
- Determine what improvement or changes are needed
Display the inventory information in a way that everyone can understand it.

- Worksheets
- Photos
- Tables
- Maps
- Other

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<th>Ground Cover Category</th>
<th>Percent</th>
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<td>Rock</td>
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<td>Live Basal Vegetation</td>
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<th>Scientific Name</th>
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<tr>
<td>BOCU</td>
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Soils
0 to 20"+ Vertical Clay
Surface is cobbly to bouldery, no rocks in profile.

GPS: NAD83 12S 418402E
UTM: 3768967N
Phase II of the planning process is the decision phase.

- Develop and evaluate the alternatives and make decisions.
The Resource Management System Alternative describes everything that needs to be done, and how the whole plan will eventually work. It ensures sustainable use of the resources, and addresses the goals and objectives of the decision makers. It helps identify the priorities, and helps explain to everyone how the whole plan will eventually work. It makes sure conservation practices are designed for all of their intended purposes, now and in the future.
### Step 5: Develop the Resource Management System Alternative

<table>
<thead>
<tr>
<th>Resource Concern</th>
<th>Quality Criteria or Desired Condition</th>
<th>Benchmark Assessment</th>
<th>Possible Conservation Practices</th>
<th>Description and Recommended Target</th>
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</table>
| Soil Condition Compaction      | Management-induced compacted zones that limit plant root growth and/or water movement are not present. Soil penetrometer readings are less than 300 PSI at or near field capacity on 2 out of 3 samples per conservation management unit. | Max Compaction Readings Conservation Mgmt Unit 1  
SS 1, 250 psi at 2in  
SS2, 200 psi at 10in  
SS3, 250 psi at 12in  
SS 4, 300 psi at 2in  
SS 5, 250 psi at 1in  
Conservation Mgmt Unit 2  
SS6, 250 psi at 2in  
SS7, 250 psi at 4in  
SS8, 250 psi at 1in | Essential Practices  
Residue Management, Mulch Till  
Residue Management, Ridge Till  
Residue Management, No Till  
Residue Management, Seasonal  
Accelerating Practices  
Deep Tillage | Recommend minimizing tillage operations and continued residue management to maintain infiltration and prevent compaction problems. |
| Soil Contaminants, Excess Salts and Other Chemicals | Salinity levels cause less than a 10% decrease in plant yield. Other contaminants do not exceed plant tolerances or are below toxic levels for plants or animals. | All vegetation grown has no yield losses with Electrical Conductivity (EC) < 2 dS/m.  
Producer Soil Test (EC) ranges from 0.61 to 1.64. | Essential Practices  
Irrigation Water Management  
Accelerating Practices  
Salinity and Sodic Soil Management | This is not a resource problem, but soil tests indicate high sodium in some fields. Recommend including leaching each year in the Irrigation Water Management Plan. Salinity and Sodic Soil Management may be needed that provides soil supplements to facilitate leaching of sodium salts. |
Benefits of Resource Management System Planning

- Looks at the bigger picture – how the entire operation will operate, and interact
- Considers on-site and off-site effects of the client’s operation
- Avoids creating new problems
- Ensures sustainability of the natural resources
STEP 6: EVALUATE ALTERNATIVES

- When you are evaluating alternatives, you must understand the cause of the problems. If the cause is not understood, return to Phase I to gather and analyze additional information.
- Develop the resource management system alternative that include a mix of structural, vegetative, and management practices needed.
- Include environmental, economic and social goals and objectives in the process.
STEP 6: EVALUATE ALTERNATIVES

- A conservation plan is a suite of conservation practices that will work together to achieve the conservation goals and objectives.

- Structural Practices
  - Fence
  - Pipeline
  - Well

- Vegetative Practices
  - Seeding
  - Brush Control
  - Noxious Weed Control

- Management Practices
  - Prescribed Grazing
  - Conservation Crop Rotations
  - Irrigation Water Management
  - Upland Wildlife Habitat Management

For a list of conservation practices, find the NRCS National Handbook of Conservation Practices at http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849
Make sure everyone understands the regulatory requirements for any proposed actions.

- Permits
- Endangered Species Act
- Cultural Resource Protection
- Clean Water Act
- USDA Highly Erodible Land and Wetland Compliance
- etc
Step 7: Make Decisions

- Your Conservation Plan is what you are ready, willing and able to work on now.

- Goals and objectives, including resource concerns to be addressed

- Practice schedule showing planned practices and the planned month and year of installation.

- Narratives for each planned practice that describes the purpose(s) of installing each practice, and what exactly is planned.
DEVELOP THE CONSERVATION PLAN MAP

- Planned fields and pastures.
- Appropriate layers from the Benchmark Inventory Map (existing structures and treatments)
- Show planned structural practices
- Show planned vegetative or management practices that will be applied on a portion of a land unit (i.e. range seeding, brush management, windbreaks).
Implementing the plan is the step we want to get to - it is the purpose of the planning process.

- NRCS and other agencies can help provide designs for all of the conservation practices the farmer or rancher would like to install to implement their conservation plan.
NRCS Conservation Practice Standards establish the minimum level of acceptable quality for planning, designing, installing, operating, and maintaining conservation practices.
Conservation Districts, NRCS and other agencies can provide the farmer or rancher with site specific designs to install conservation practice that address the resource concerns and meet the requirements in the practice standard.
Farmers and ranchers who have an approved conservation plan can also apply for financial assistance to install conservation practices that address priority natural resource concerns identified by the Conservation Districts.
STEP 9 – EVALUATE THE PLAN
Monitoring is essential to evaluate the effectiveness of the conservation plan in conserving, sustaining and improving the resources.

- Monitoring provides the client with information for making better decisions.

- Monitoring helps everyone become better planners.
Monitor to see if you are meeting your goals
Adaptive Management

- Monitoring will help determine if changes are needed in the conservation plan.
  - Ecological systems are complex and dynamic
  - Our knowledge of ecological systems is incomplete
  - The art and science of natural resource management will continue to evolve
  - Monitoring, evaluating, and adjusting increases our knowledge
First Nations Support

- First Nations is working with the 14R ranchers on the Navajo Nation to develop a conservation planning template for tribal producers.
- We will be presenting more details at the L.E.A.D conference in Sante Fe NM in September.
It is YOUR Conservation Plan

- Remember, the farmer or rancher
  - Is the decision maker
  - Develops the plan
  - Owns the plan
  - Monitors
  - Makes changes

- Use the agencies to help you – not do it for you.