

Conservation Planning Tools and Resources

A Reference for Agricultural Producers

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Introduction

This workbook was developed to provide agricultural producers and other land managers with information and online resources that may be useful for developing and implementing a conservation plan for USDA financial assistance programs.

The Natural Resources Conservation Service (NRCS) has been helping agricultural producers develop conservation plans across the entire United States for over 80 years. They have an enormous amount of information on-line that is used by their Field Office staff and Technical Service Providers, and tools like [Web Soil Survey](#) and the [Geospatial Data Gateway](#) that were specifically developed to provide information to producers and other land managers. NRCS also has financial assistance programs that can help producers implement their conservation plans, and we have provided information in the appendix about learning more about those programs.

Many other state, tribal and federal agencies and non-government organizations also provide information and resources that can be very useful and important in developing a conservation plan. This guide links to some of those resources as well.

This reference was organized based on the steps an NRCS conservation planner might typically go through to help a producer develop their conservation plan. At each step, we show you where you can get the information or tools that are used in the process.

It all starts with soil map and a benchmark inventory map.

Soil and Ecological Site Maps

One of the foundations of conservation planning is developing an understanding what each acre of land is capable of, and managing the land and natural resources according to the potential and limitations of each acre. A conservation plan always includes a soil map of the area being managed, and soil reports that describe the characteristics of those soils and the plant communities the soils can support. [NRCS Ecological Site Descriptions](#) provide information about the native plant communities produced by each soil type on forests and rangelands. Forage Suitability Group descriptions may be available in some areas that describe typical forage species and annual production on pasturelands. And some soil surveys provide information about the typical crop yields on each soil type for the common crops grown in the areas.

Most of this soil and plant community information, and some pretty good base maps for your conservation plan can be obtained by using the NRCS Web Soil Survey <https://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. There are many helpful features on the web site that will help you get the information and maps you need.

Here is the basic process you will follow to generate a soil map and soil report for your planning area.

1. Go to the web site for web soil survey <https://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>
2. Click on the big green button (Start WSS)
3. The first step is to create an "Area of Interest". There are two basic ways to do that.
 - a. If you have a GIS shapefile for your area, you can import that.
 - b. Or, use the interactive map tools to pan and zoom in to your area, and then use the "AOI" tool to outline (digitize) your "Area of Interest". The AOI tool on the far right is the most useful if your area of interest is not just a square field (the other AOI tool option). Click on the AOI tool, then on the map, use your mouse to start on one corner of your planning area, then keep clicking along the boundary of your area until you have it outlined. Double click the last point to finish the area of interest. The area you outlined will turn into a blue crosshatched area when you double click the last point.
4. Note that the size of the area must be less than 100,000 acres, so if your planning area is larger than that you will need to divide the area into smaller units and create a separate soil map for each subarea.
5. Next, click on the tab near the top of the page that says, "Soil Map". The soil map for your area of interest will be created, and the names and acres of each soil type will be shown in the table on the left.
6. There are many things you can do from here, and many different maps you can create. Here are a couple useful tips.

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- a. First, on the left side of the map you will see a “Legend” tab. Click on it, and you can turn on other available map layers like section, township range information and land ownership. At the bottom, you can also change the base map from an aerial photo to a topographic map if that is more useful.
 - b. If the scale of the map is greater than 1:50:000, the soil map labels do not print correctly in the report. Click on the scale button at the top of the map, and change it to something less than 1:50,000. If you choose 1:24,000 for example, your maps will print out at the same scale as an official USGS topo map. Maps of larger areas will be printed on multiple pages. The smaller the scale number, the larger the map will be.
 7. Once you are satisfied with the soil map, click on “Add to Shopping Cart” in the upper right corner of the screen. You can add a custom subtitle for the report – like the name of your farm or ranch.
 8. If you are developing a conservation plan on forest or rangelands, then you should also include an ecological site map and report in your final soil report. Click on the Soil Data Explorer Tab near the top of the page, and then click on the “Ecological Site Assessment” Tab. An ecological site map will be generated. Click on “View All Ecological Site Info” and a table will be created below the map that shows the ecological sites assigned to each soil type in each soil map unit. , and you will see information about each ecological site on the left panel. Click on “Add to Shopping Cart” to add the ecological site map and table to your report.
 9. Under each ecological site tab on the left side of the screen, you can click on “Historical Climax Plant Community” and then “View Plant Community Info” to see information about the annual production of the native plant communities, and a list of the native plant species that grow on that soil. If you click on “Add to Shopping Cart” as you open up each of these, all of this native plant community information will be added to your final soil report. If you click on the highlighted name of any plant in the plant list, you will be taken to the [NRCS Plants Database](#) where you can see a picture of that plant, a map of where it grows in the U.S., and other information about that species.
 10. When you click on the “Shopping Cart” tab near the top of the screen, you will see the list of reports and maps you have “Added to the Shopping Cart”. You can uncheck boxes for those items you do not want to include in the final report. Then click “Check Out” in the top right corner of the screen. Use the option “get now” and click ok. Your custom soil report and maps will be generated as a pdf file that will open on your computer screen. You can download that report to your computer for your conservation plan. Right click on the report, and choose “Save As” to save the report where you want it on your computer.
 11. If you don’t have adobe acrobat reader on your computer, you will want to download this free software that will allow you to open and read pdf files. <https://get.adobe.com/reader/>

Benchmark Inventory Map

The next map you will want to create for your conservation plan is a benchmark inventory map. The benchmark inventory map shows everything you know about the land, what improvements have been made, and where there are still problems to address.

This benchmark map is used to show all of the existing structures and features on your property or operation. You want to show where the existing wells, fences, pipelines, ditches, ponds, and other structural improvements are. You'll also want to show where any past treatments have been done, like brush management, prescribed or natural burns, seeding, and other treatments. And finally, the benchmark inventory map should show the problem areas on your operation, which may include areas with excessive runoff or erosion, gullies, areas with noxious weeds or an invasion of woody species, areas that get grazed too heavily and areas that are not being grazed.

The maps you can get from Web Soil Survey may also be useful for your use as a base map for your benchmark inventory maps. There are also other very useful online mapping tools like Google Earth, which can provide aerial imagery, and even 3d views of any area you zoom into - like the one below.

<https://www.google.com/earth/>



Figure 1: 3D Image from Google Earth

The United States Geological Survey (USFS) develops topographic maps for the entire U.S. and makes those available for free at <https://nationalmap.gov/ustopo/>

For some conservation plans, maps printed on 8.5 x 11" letter sized paper are perfectly adequate. In other cases, you may want to find a way to print your maps on larger paper. Check with your local stores who can print pictures, and see what they charge for poster size

prints. Right now, a 24" x 36" poster print at one of the big box stores will cost you about \$25 to print. Your local NRCS office or other state, tribal, county or federal agency offices may also be willing to print a couple of large size maps for you to use for your conservation plan.

If you have GIS software for creating maps, NRCS provides free GIS data on their Geospatial Data Gateway <https://gdg.sc.egov.usda.gov/> Many other agencies and universities also provide free GIS data for mapping. If you want to try to learn how to use GIS software, QGIS has a free GIS software package you can download <https://www.qgis.org/en/site/>

Conservation Plan Map

A third map you will need to create in most cases is a conservation plan map. This is the map that will show where all of your "planned" conservation practices will be installed – new wells, pipelines, brush control areas, fences etc. Each planned conservation practice should use the appropriate symbol, and be labeled, so that it will tie back to a description of that practice in the practice schedule document. Google earth other online maps can be used for your conservation plan map as well.

Map Symbols

There is not a good conservation planning map symbols guide available online, but there are some copies of old map symbol guides that have been scanned and saved in the NRCS Field Office Technical Guides, or on university and agency web sites. Check with your local agency offices to see what they use for standard map symbols.

The National Planning Procedures Handbook and the NRCS Field Office Technical Guide

There are two primary references that NRCS Field Office employees use for developing conservation plans with their clients. The National Planning Procedures Handbook <https://directives.sc.egov.usda.gov/36483.wba> is the primary technical referenced the provides a detailed description of the steps in the NRCS conservation planning process. This handbook will provide you with an excellent overview of the NRCS conservation planning process, and provide definitions for terms used by NRCS.

The NRCS Field Office Technical Guide is a huge warehouse of NRCS technical information, guides, worksheets, and other tools and models that are used by NRCS staff to conduct resource inventories, analyze data and alternatives, design conservation practices, and to learn more about the soil, water, air and plant resources in an area.

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/>

Each state maintains a separate Field Office Technical Guide, and in some cases information is specific to a county. Generally, you can click on any county in the state map, and get all of the information.

The Field Office Technical Guide is divided into five sections:

Section I General References, such as reference maps, watershed information, and links to NRCS reference manuals and handbooks, researchers and universities.

Section II Natural Resources Information to conduct inventories and assessments of soil, water, air, plant, and animal resources.

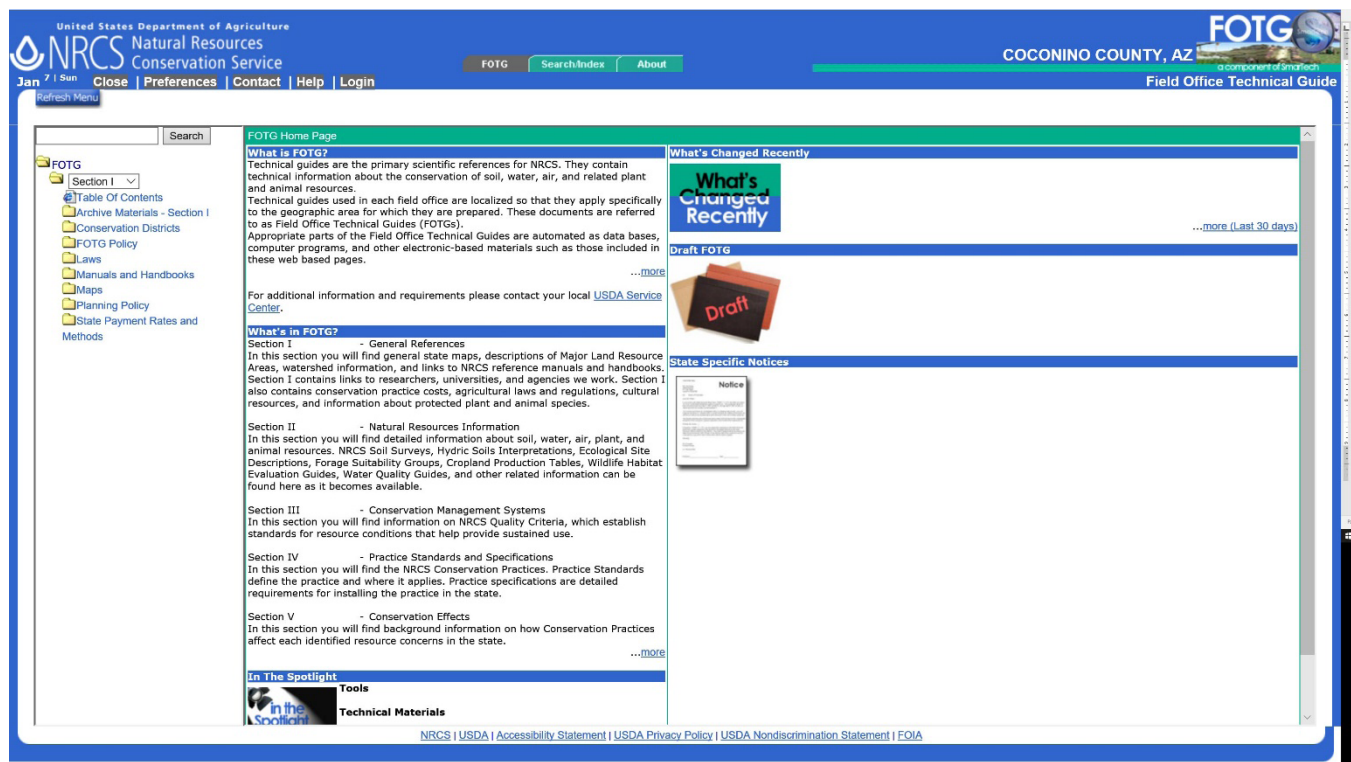
Section III Conservation Management Systems to develop and evaluate alternatives for solving resource problems.

Section IV NRCS Conservation Practice Standards define the practice, where it applies, and the minimum design criteria and Specifications are detailed requirements for installing the practice for a specific site.

Section V Conservation Effects provides background information on how Conservation Practices affect each identified resource concern.

To see what is in the NRCS Field Office Technical Guide, first click on the state you are interested on this map <https://efotg.sc.egov.usda.gov/> and then click on a county in the next map. In many cases it does not matter which county you choose – you will get the same information.

Figure 2: NRCS Field Office Technical Guide screen



When you first open the Field Office Technical Guide (FOTG), you will see a screen that looks like the picture above. The contents showing on the left pane will look different for each State and/or County. Newly updated documents and special notices will show up in the

panels on the right. Using the drop-down choice list in the left panel, you can choose to view Section I through V of the FOTG. Each folder under that section will then have a collection of documents, worksheets, maps, or tools that you can view, download, and use in developing your conservation plan. There are literally thousands of documents available by going to different states, and browsing through each of the 5 sections.

Technical Service Provider References

NRCS maintains several web pages for Technical Service Providers, who are independent contractors that producers can hire to help them get some of the NRCS planning and practice design work done. These same websites can be used to provide producers and other land managers with tools and guides used by NRCS.

NRCS Technical Service Provider websites

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/tsp/>

<https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/technical/tsp?cid=stelprdb1045259>

Technical Service Provider State Specific modules provide a lot of useful information about typical conservation systems and important laws and regulations you should be aware of in each state, along with basic conservation planning guidelines.

Certified Conservation Planner-State Specific Training Modules: <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/technical/tsp?cid=nrcseprd403442>

The NRCS Science and Technology Training Library <http://www.conservationwebinars.net/> provides recorded webinars, and a schedule of upcoming webinars about topics ranging from learning about soil health to the Field Office Technical Guide and Conservation Planning.

Other Reference Manuals and Handbooks

NRCS has many excellent manuals, handbooks, and technical references available online, that can help you learn more about conservation planning and about managing your natural resources Here is a link to all of the NRCS Electronic Directives including the general manual that contains all NRCS policies, plus links to engineering, range, forestry, agronomy and other handbooks and manuals and technical notes used by NRCS Field Offices.

<https://directives.sc.egov.usda.gov/Default.aspx>

For a list of all of the NRCS Conservation Practices, that list is kept current here: <https://directives.sc.egov.usda.gov/41691.wba>

Key references for Livestock Operations

If you are developing a conservation plan on rangeland, pastureland, or grazed forests primarily for managing a livestock operation, then it is highly recommended that you review the [NRCS National Range and Pasture Handbook](#). This handbook will provide you with a wealth of information about ecological sites, grazing management, inventory and monitoring methods, and other information useful for conservation planning on a livestock operation. You should also download a copy [Interpreting Indicators of Rangeland Health - Version 4](#) that is used by NRCS for evaluating the health of rangeland. There are also many interagency references that are useful for inventorying and monitoring grazing lands. The [Guide to Rangeland Monitoring and Assessment](#) provides information on the most common inventory methods used by NRCS and other federal agencies.

Environmental and Cultural Resource laws

You may need to learn more about several environmental and cultural resource protection laws that can affect your conservation plan, or require that you get approval or permits from state and federal agencies before you install a conservation practice. Here are some of the important federal laws to be aware of. You also need to be familiar with state and tribal laws.

Cultural Resource laws <http://www.achp.gov/NHPA.pdf>

Endangered Species Act (ESA)- <https://www.fws.gov/endangered/laws-policies/>

Migratory Bird Treaty Act of 1918 <https://www.fws.gov/laws/lawsdigest/migtrea.html>

Bald and Golden Eagle Act <https://www.fws.gov/midwest/eagle/protect/laws.html>

Clean Water Act <https://www.epa.gov/laws-regulations/summary-clean-water-act>

Clean Air Act <https://www.epa.gov/clean-air-act-overview>

Invasive Species- <https://www.invasivespeciesinfo.gov/unitedstates/az.shtml>

NRCS Financial Assistance Programs

The USDA Natural Resource Conservation Service has several financial assistance programs that are specifically designed to help agricultural producers implement their conservation plans. The Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP) are the ones that are used by most agricultural producers.

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/>

State Payment Schedules show the incentive rates that NRCS offers for installing Conservation Practices in your state. The following link provides that information.

<https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/?cid=nrcseprd1328426>

To participate in many NRCS programs, the producer will need a Duns and SAM number. Here is where you can find out more about those

<https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/?cid=stelprdb1257063>

APPENDIX A:

Useful measurement For Conservation Planning:

There are many handy conversion sites on the Internet and available through smart phone apps. One of the most comprehensive is: <https://www.convert-me.com/en/>. Here are some common units of measure used in conservation planning.

Length

1 inch (in.) = 2.54 cm

1 centimeter = 0.3937 in.

1 foot (ft.) = 30.48 cm

1 mile (mi) = 5,280 feet or 1.609 km

1 kilometer = 0.6214 mile

1 meter = 39.37 in. = 3.821 ft.

Area

1 acre = 43,560 ft²

1 square mile (mi²) = 640 acres = 1 Section

1 square foot (ft²) = 929 cm² = 144 square inches

Volume

1 liter (l) = 1000cm³ = 1.057 quart (qt) = 61.02 in³ = 0.03532 ft³

1 cubic meter (m³) = 1000 l = 35.32 ft³

1 cubic foot (ft³) = 7.481 U.S. gal = 0.02832 m³ = 28.32 l

1 U.S. gallon (gal) = 231 in³

1 gal=4 qt= 8 pints=128 oz

1 acre foot= 325,851 gallons

27 cubic feet = 1 cubic yard

Units of Flow

1 Cubic Foot per Second (CFS) = 7.481 gal/sec = 448.8 gal/min = 23.8 acre inches in 24 hrs

1 gallon per minute = 0.00223 cubic feet per second

1 CFS for 1 hour = 1 acre inch = 27,154 gallons

Mass

1 kilogram (kg) = 2.205 pounds (lb)

1 lb = 453.6 gm



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