Indiana FIELD OFFICE TECHNICAL GUIDE

Section V Conservation Effects

The Conservation Practice Physical Effects (CPPE) is displayed in two formats: a CPPE per practice and a CPPE Matrix comparing all practices and effects. At this time only the CPPE per practice is available on this site.

Introduction

Planning the soil, water, air, plant and animal resources and their interrelationships has increased the complexity of assisting our clients. NRCS can no longer provide alternatives and assistance that address individual problems without being aware, and making our clients aware, of the effects on all natural resources.

As a technical agency, NRCS must constantly strive to improve methods to evaluate the potential effects of conservation practices on the natural resources when providing technical assistance. It is necessary to determine the physical effects relevant to each resource during the planning process because a conservation practice, which has a positive effect on one resource problem, may have a positive or negative effect on other resources. One conservation practice usually does not completely solve a problem; consideration must be given to all natural resources. The objective of the landuser must also be considered when working with natural resources.

Purpose

The purpose of Section V is twofold:

A) To provide a repository of data on the effects of conservation activities. Such data is an important part of technical reference material used by NRCS and our clients in planning conservation actions. NRCS determines the effects of conservation treatments in order to help formulate and facilitate the identification of suitable conservation management systems to protect the resource base and to address the client's and society's social, cultural and economic objectives.

B) To serve as a source of appropriate procedures and methods for collecting, analyzing and displaying conservation effects data.

Conservation effects information will typically include the resource setting (i.e., soil, slope, etc.), the specific conservation treatments applied, the kinds, amounts and timing of actions undertaken by clients in their operations and the expected outcome in terms of solving resource problems and meeting social, cultural and economic objectives.

The effects of conservation may be expressed in either narrative terms that represent factual data on experience or expected results of the specified conservation treatment as applied to the resource setting. For example, typical effects could be: a corn yield of180 bushels per acre; an erosion rate of 4 tons per acre; or "a significant reduction in ephemeral gully erosion will occur with this treatment.

To the extent possible, conservation effects information will include conservation treatments on the five resources and their considerations as described in Section III. Examples of effects on conservation treatment on natural resources include but are not limited to:

• Expected effect on sheet and rill, wind or ephemeral gully erosion.

• Indicators or measures of soil conditions, such as tilth, compaction and infiltration.

• Where applicable, indicators of soil deposition.

• Measures or indicators of effects on quality and quantity of surface or subsurface waters, such as chemical runoff as influenced by the conservation system.

• Effects on plant conditions and management, such as expected status of range conditions with the indicated range conservation actions.

• Measures of conservation effects on wild and domestic animals, including animal waste uses and effects on the resource base.

• Indicators of effects on air, such as airborne particles, odors and chemical drift.

Effects information will also include management, social, cultural and economic information.

Factors such as cost, client acceptability and physical changes to cultural resource sites associated with the specific conservation treatment component are to be identified. Included for example would be:

• Tillage requirements, labor inputs, quantity and costs of inputs, net economic returns, experienced yields, risk management requirements, operation and maintenance requirements, time requirements, cultural resources (archaeological and historic properties), length of life practices, health and safety, aesthetics and community effects.

Information developed on conservation effects will vary significantly in scope and detail depending on the resource conditions in the local area as well as upon the needs for technical reference materials to carry out conservation activities in that location.

Effects for RMS Formulation

Section V contains summaries of effects data relevant to the field office area. As a minimum, Section V should contain a display of the important effects for decision making for each RMS developed and inserted in Section III. The display should be cross referenced with cropping system, soil map units and other descriptions of the resource setting and conditions (e.g., precipitation, slope, etc.) that the RMS was formulated to address in that field office. The format of the display should be easily understandable so as to make the information valuable as ready reference material for planning and decision making. The display will show the degree of resource protection achieved.

Collection of data on conservation effects is a long-term effort to be undertaken as part of the follow-up element in the planning process. Initial efforts may provide effect information for only the most common situations. Over time, additional resource

situations and treatment alternatives will be examined to add depth and breath to the available conservation effect information.

Information on conservation effects may be refined or updated over time as needed in the local area. The data on conservation effects should be useful to field office personnel in identifying suitable conservation treatment applicable to the area, and serves as technical reference materials when working with clients in the conservation planning process.

The tools contained in this guide will help develop resource management systems and assist the planning process. These technical materials will help evaluate the effect of applying resource management systems on the identified and predictable problems affecting the soil, water, air, plant and animal resources dealt with in conservation planning. They are also excellent training tools for establishing a "pattern of thinking" for developing effective RMSs in conservation planning assistance with individuals in real world situations. When making planning recommendations, the conservationist must be reasonably certain that the identified and predictable resource problems are treated without creating new problems in one ore more of the other resources. RMS options formulated must meet established quality criteria. This guide provides the process and working tools for consistently achieving adequate treatment of the resources.

Effects for Decision Making

Section V is structured around the Conservation Effects for Decision Making (CED) framework. This framework encourages the conservationist to draw two pictures of the world: 1) A benchmark condition without conservation; and 2) the conditions that would be expected with conservation treatment. The scenarios are then used to identify the changes between the two conditions. By displaying both the advantages and the disadvantages, the conservationist can show what the conservation treatment means from the landowner's perspective.

To be most useful, the effects information used in CED and contained in Section V must be factual, realistic, and practical. It may come from the planner's personal experience, from research and field trials, or (preferably) from case studies of conservation applied on local farms.

CED is a process that helps landusers understand the effects of resource management systems on their own operation. The process helps the planner display the impacts of conservation options when compared to some benchmark condition. The "benchmark" is normally the current conditions as they exist on the client's land.

Impacts may be rated by the decisionmaker as beneficial or adverse depending on his or her values. The amount of information given to the producer should be that amount that is enough to help him or her make a decision. Information will generally be provided as needed in a stepwise, hierarchical fashion with each step offering more detail, complexity or quantification until a point is reached where the decision maker receives sufficient information to make a informed decision.

Central to collecting information to use in the CED process is follow-up and documentation of effects. What the conservation planner discovers during follow up will add to NRCS's experiences and knowledge base and should be put back into the CED process and Section V. Effects are to be recorded for each of the natural resources and other items relating to the client's farm operations.

On way to assemble needed effect information is through the use of case studies. Case study information is recorded during the planning process and verified during follow up. Information from case studies should be shared between field offices to the extent possible and placed in Section V-B. This collection and improvement process will be a continuing activity that will gradually add to the total quality of Section V and the conservation plans that result from its use.

Implementation of CED will be assisted through the use of information displays regarding conservation options and through worksheets used to record the current of "benchmark" conditions. A display of the conservation treatment option information should be prepared for each of the common or dominant resource situations and cropping sequences prevalent in a field office. The information assembled to document the effects of conservation options is compared to information regarding the client's current of benchmark condition. Such information is captured during the planning process. The difference between the benchmark condition and a treatment option is the impact of installing that option and should serve as the basis for making a decision to install or reject an option.

Section V

Conservation Practice Physical Effects

The Conservation Practice Physical Effects (CPPE) displays in subjective detail the physical effects that conservation practices have on resource problems for the natural resources based on experience and available technical information. Each resource may have multiple problems associated with it. The effects of practices may be greater if they are associated with a land use change. Onsite effects of practices are generally greater than offsite. The further away from the problem or treatment the less the effect.

The key question that should be asked when reviewing the CPPE is "If this practice is applied, what effect will it have not only on the target problem, but also on all other resource problems?"

CPPE Matrix Description

In the CPPE matrices, the major effects of a single conservation practice on resource problems are identified. An interdisciplinary team identified the effects. The purpose of these matrices is to help the planner develop and maintain a strong awareness of the effects of conservation practices on all the basic natural resources.

Both short and long term effects were identified in the CPPE Matrix. Short term is defined as the "installation period or implementation period" of the conservation practice and long term as the "useful life of the practice".

The conservation effect may classified in one of the following forms, followed by additional information for clarity:

Effect	Definition
N/A	Essentially no Effect
Facilitating	Supports another Practice's Effects

Insignificant No Measurable Change
Situational Effects depend on Specific Application
Slight Minor change
Moderate Meaningful Change
Significant Considerable Change

A decrease or increase in the problem indicates the direction the installed practice has on the resource problem. For example, a practice may *moderately decrease* an erosion problem and *slightly increase* a water quality problem. The period, magnitude and direction of the conservation effect are all identified in the CPPE.

In the CPPE Matrix the resource problems are listed at the top of each column and conservation practices are found at each row. A brief description of problems and practices are also included. The effect the conservation practice has on the resource problem is found at the intersection of the column and row.

The practice is assumed to be installed according to standards in Section IV, and that there is a current problem with the resource and the resource problem can be addressed by the installation of a conservation practice. The matrices address broad, general effects that may be expected from the practice application.

The effects shown in the matrices in Section V will need to be adjusted to reflect site specific conditions for a given practice. Use the following guidelines when developing site specific effects:

Evaluate each practice for the effect it will have on the area being planned (i.e., a field or a CMU) and not the inevitable effect on the immediate area surrounding installation.

Assume all practices will be installed according to practice standards in Section IV of the FOTG.

Do not "reach" for effects. Not all practices have an effect on all possible problems associated with each resource.

Assume that each practice is applied independently of others.

Do not evaluate "systems" practices (e.g., Waste Management System) but evaluate each of the component practices.

Assume that the practice being evaluated is not presently applied.

Evaluate practices based on fields or CMUs that result from planning decisions, not necessarily for the original field. (The present field may need to be divided to meet landowner objectives.)

When a land use change is considered, evaluate practices needed to change the land use against present conditions. Evaluate practices necessary to manage the new land use against expected future conditions.

The planner needs to recognize the effect of applying conservation practices in order to select combinations of practices that solve the identified or predictable problems without creating new problems. In addition, secondary benefits should be identified. The effects concept is applicable for formulation of RMS options for specific fields, conservation

management units, or other planning areas. It can also be used to assist in development of FOTG guidance documents and to explain resource problems and potential solutions to the decisionmaker and to others. It is simply another tool to assist the planning process.

Effects for Guidance Documents

T**wo worksheets, the Site Specific Practice Effects Worksheet and the Resource Management System Options Worksheet, can be used in conjunction with the CPPE to aid the planning process, and are filed with the Guidance Documents in Section III of the FOTG. These documents also provide the information used in the CED process.**

Site Specific Practice Effects Worksheet

This worksheet uses the practices in the CPPE to develop the most applicable conservation practices to address site specific identified or predictable resource problems while considering land user objectives. It displays effects for only the identified resource problems that exist, are predicted on the planning area, or have influence offsite. This array of practices lends itself to a quick comparison of the relative value of each practice including both positive and negative effects on the resource problems identified.

Resource Management System Options Worksheet

Conservation practices that have the potential to solve the resource problems that were listed on the Site Specific Practice Effects Worksheet are now grouped in combinations and placed on the RMS Options Worksheet to address the identified site specific problems. The different combinations of practices became RMS options when the quality criteria have been achieved for all the identified and predictable resource problems.

The Site Specific Practice Effects Worksheet or the Resource Management System Options Worksheet should not have to be filled out for each conservation plan. This will depend on the experience of the conservationist and complexity of the situation. The entire process of the effects concept will not be needed when working with each decision-maker. Once the process is understood and implemented, only unique or complex situations would warrant documentation of the complete process.

After the RMS options have been developed the Conservation Effects for Decision making (CED) process may be followed if the land user needs additional information to reach a decision. Together, these technical tools provide a powerful technique to plan, evaluate and select RMSs.

Section V

Conservation Effects Data

Producer Experiences

Data on conservation effects are developed by observing and documenting the experiences of landusers. Typically, conservationists will make observations of conservation treatments applied by one or more landuser in the first or second year following the application and record the effects. This data is recorded in conservation field notes. Effects information may also be available from conservation field trials, university

research plots or other trials in the area. Experience gleaned from actual operating farms during and after the implementation of a RMS is the most desired source of information regarding the effects of conservation. This can come from:

• Case Studies of experience gained from a specific on-farm conservation undertaking.

• On-farm Field Trials of new or unproved techniques or technology.

• Conservation Effects Worksheets are structured conservation technical assistance notes used to record the effects of a resource treatment. CEW's collected from a series of farms can provide very reliable data for use in conservation planning.

Case Studies

Case studies describe before and after treatment resource conditions. A case study demonstrates how a recommended conservation treatment achieved a cooperator's objectives and effectively treated resource problems. Sharing case studies with potential cooperators will promote new conservation planning opportunities and accomplish additional levels of treatment. Case studies are not intended to be intensive scientific studies to determine cause and effect relationships. Case studies can be used for public information campaigns including brochures, information sheets, training material and news articles.

There are potential problems with case studies. Attributing change to a conservation treatment is complex and is difficult to predict based on only one example. When formulating case studies consideration should be given to weather variability, changes in management and measurement error. These weaknesses do not diminish the usefulness of case studies. It should be made clear to cooperators that results achieved on your neighbor's farms could reasonably be achieved on your own farm.

Case studies are highly recommended as planning and public information tools, but they are not mandatory nor are there any required formats that must be followed. The same results may come from university research, conservation field trials and the expert knowledge of others. Case studies provide "effects" information for the FOTG and are simply another planning tool for providing assistance.

The key to a successful case study is to select resource situations with a broad applicability to many landusers. Case studies should be developed for major resource concerns on soil mapping units and in resource use situations that represent a significant portion of the resource users in your area. Formulating a case study follows the following steps:

1. **Select Resource Problem - soil productivity loss, water quality degradation**
2. **Select Typical Resource Use - crop rotation, livestock enterprise**
3. **Select Cooperative Landuser - knowledgeable, respected and "early adopter" cooperator**
4. **Record the Benchmark Situation - before conservation treatment actions and effects**
5. **Select Conservation Treatment - with conservation treatment actions and effects**
6. **Identify the Effects of the Conservation Treatment - changes that occur as a result of treatment**
7. **Record How the Effects Influence Decisionmaker - cooperator's value judgement on treatment changes**
8. **Update Case Study - follow case study over time**

9. **File Case Studies in Section V-B of the FOTG - use for planning, training or share with other field offices**

Section V

Other Effect Information

Models of processes impacted by conservation actions can be used to simulate the physical, agronomic or other effects of treatment systems. Actual results or graphs summarizing results could be developed by state staffs and provided to field offices for inclusion in Section V. Appropriate models, or references to the appropriate models, are stored in Section V to facilitate collecting and analyzing conservation effects data.

In the absence of information collected directly from producers for use in CED planning, information from other sources should be used. These sources include:

• Expert Knowledge from informal observation of producer experiences.

• Evaluations conducted for other NRCS programs such as watershed protection program, etc.

• Other Agency Studies, e.g., ARS, Universities, Extension Service, etc.

• Models (including expert systems).