GENERAL EFFECTS DATA

Conservation Practice Physical Effects (CPPEs) provide an indication of the actual physical effect expected to occur on natural resources when a conservation practice is installed. The effects are expressed in narrative terms that represent the expected results when conservation treatment is applied. These terms are described below. The following resources are evaluated for each conservation practice: Soil, Water, Animal, Plant, Air. Resource Concerns that may deteriorate are listed for each resource. Indicators that express the deterioration of the resource are listed along with the physical effect that results from the practice being applied. The CPPE information is recorded in a table format for each NRCS conservation practice. Most of the effects are based on empirical information rather than scientific data.

Description of the terms used to express the Conservation Practice Physical Effect.

Not Applicable: The conservation practice being evaluated has no relationship (i.e., no effect) on the conservation problem identified.

Insignificant: There is an effect of the practice on the problem of concern, but the effect is insignificant.

Slight: There is some non-measurable effect (positive or negative) of the practice on the resource problem of concern, but not enough to influence the decision to select the practice to solve the problem.

Moderate: There is a measurable effect (positive or negative) of this practice on the resource problem of concern which would have an influence on selection of the practice in CMS options.

Significant: There is a major measurable effect (positive or negative) of the practice on the resource problem which would have a major influence on the selection of the practice in CMS options.

Situational: There is no clear effect for the practice on the resource concern. The effect (positive or negative) will be determined based on conditions at the site.

RESOURCE INDICATORS:

1. General Onsite - Offsite Effects

Onsite versus offsite usually show a similar explanation, except for degree of effect. Generally, the onsite sediment effects are higher because of being closer to the erosion source with high sediment yield (i.e. high sediment delivery ratio). The offsite sediment effects are smaller because of being farther away from the site of the problem, and because additional drainage area is included that may not have the problem, and therefore the effect is diluted. However, for some situations, such as safety problems, the offsite sediment effects are higher because a larger number of people are being affected off the farm (i.e., at the county road or other road arterial) compared to within the farm boundary. In a field situation the offsite sediment effect on a conveyance system or water body may be significant if the source of the problem is right next to the water body (i.e., has very high sediment yield because of a high sediment delivery ratio). In addition, if the source of the erosion is the conveyance, which has a high sediment delivery ratio, the offsite sediment effects may be as significant or more significant than onsite.

2. Water Effects (Surface Water)

The physical and chemical properties of streams are varied as the climates and geology, soils, plants, and animals of the localities where the streams are located. This is especially true for intermittent streams, which are more variable than perennial streams, because they contain less

water per unit area, and are closely linked to the climate, topography, geology, soils, and vegetation of the area. Increasing the flow of an intermittent stream to that of a perennial stream tends to reduce some of the variability. However, the reverse of reducing the flow of a perennial or intermittent stream, to a flow condition close to where the stream dries up, has the effect to increase concentration of contaminants, and to cause severe effects on the stream biota.

3. Excess Runoff
The physical effects evaluated can apply to onsite or offsite conditions.

4. Sediment Effects (Surface Water Deposition and Concentration)
Practices that reduce sediment delivery ratios decrease sediment storage impacts for water bodies, streams, and for water conveyances. Reduced sediment delivery ratio also decreases habitat impacts from sand and fine particle size classes that degrade spawning areas, as well as enrichment ratios of nutrients, and total organic carbon, associated with intruded sediment.

5. Offsite Sediment Deposition Damage
This Indicator needs to be viewed in two ways. Sediment yield (usually expressed in volume per unit area) from any given unit of land, is usually diluted offsite because of the inclusion of more drainage areas that contribute water and sediment. Therefore offsite sediment effects may be less severe than onsite. Conversely, sediment yield offsite may be combined with sediment delivered from other sources, by the same storm, and cause more severe offsite deposition problem.

6. Small Water Conveyance
Any stream within the land unit that does not contain perennial flow is treated as a small water conveyance for evaluation.

7. Groundwater and Surface Water
Soil and vadose zone texture, structure porosity, and permeability affect the ability of the material to retain or transmit water and associated compounds. Coarser textured soils have higher infiltration rates than finer textured soils. Therefore, they have less surface area for adsorption and a higher potential for subsurface flow. However, macropores (organism tunnels, shrink-swell cracks, differential settlement fractures, joints, and landslide and fault fractures) can allow rapid infiltration of any fluid material.

8. Pesticide (Groundwater and Surface Water Resources)
The word pesticide is an all-inclusive term, which includes a number of individual chemical compounds designed specifically for the control of certain pests. Table 1 shows the 21 pesticides categorized by generic terms for each specific purpose. All but six of these generic words end in - "cide", meaning to kill or killer. Most of the pesticide names (insecticides, herbicides, fungicides, etc.) are specific to the pest for which they are intended to control.

Pesticide properties which affect their potential for leaching include solubility, adsorption (degree to which they are bound to soil particles), volatility and persistence. Pesticides are primarily adsorbed on soil organic matter surfaces, but some positively charged pesticides (i.e. diquat and paraquat) are strongly adsorbed to both the organic and clay fraction.
Plant uptake, degradation, and volatile losses of agricultural pesticides will reduce pesticide loads to surface and groundwater. Conservation practices which reduce erosion also decrease the risk of soil adsorbed pesticides from leaving the site. Practices, such as, sediment debris basins that hold sediment, will have more effect on trapping sediment and allowing pesticides to expend their half-life.

Table 1

Pesticides	Classified by Their Target Species
acaricide	mites, ticks
algaecide	algae
attractant	insects, birds, other vertebrates
avicide	birds
bactericide	bacteria
defoliant	unwanted plant leaves
desiccant	unwanted plant tops
fungicide	fungi
growth regulator	insect and plant growth
herbicide	weeds
insecticide	insects
miticide	mites
molluscicide	snails, slugs
nematicide	nematodes
piscicide	fish
predicide	vertebrates
repellents	insects, birds, other vertebrates
rodenticide	rodents
silvicide	trees and woody vegetation
slimicide	slime, molds

9. Nutrients (Groundwater and Surface Water Resources)

All applied plant nutrients are to be reflected in the CPPE with emphasis on nitrogen and phosphorus compounds. Positively charged nutrient ions such as calcium, magnesium, potassium, sodium, and ammonium are strongly adsorbed by both the clay and organic fraction of soils. Negatively charged ions like nitrate and chloride are not readily adsorbed on soil organic matter and clay surface. These soluble ions will readily move through both surface and subsurface water regimes.

Rainfall effects are quite variable. For example, a pollution problem could be caused by surface applications of nutrients and manure in the spring just prior to heavy rainfall or runoff. In contrast, a problem could be caused by fall application of a form of nitrogen that is sufficiently soluble to infiltrate and be leached out of the soil profile.

Method of application is also important, because of the difference in potential runoff. For example, for the same soil a surface broadcast or sprayed nutrient will be more likely to runoff, than a nutrient that has been injected or placed below the soil surface in the root zone.

10. Salinity (Groundwater and Surface Water Resources)

Practices that reduce seepage and deep percolation reduce salts to ditches, canals, streams, and to the groundwater. Practices such as grass crops in rotation that uptake water sufficient to lower the water table will decrease salt buildup in the soil profile and decrease dissolved salt removal, interflow, and deep seepage directly to water table. Effects are variable because of rainfall and types of vegetation, applications, kinds of salt, as well as, soil and vadose zone factors of organic matter, texture, structure, macropores, depth to water table, and type of aquifer.

11. Pathogens (Groundwater and Surface Water Resources)

Pathogens include bacteria, viruses, protozoan, helminthes (parasite worms), and fungi (molds, mildews, rusts, smuts). Pathogens can be transported in both the soluble and particulate (sediment) form. The population changes in pathogens are assessed on the basis of time, moisture content, presence of nutrients, soil organic matter, as well as, on temperature and other physical and chemical factors.

12. Metals (Groundwater and Surface Water)

Natural and man-induced metals may be transported with sediment or in a soluble form.

13. Dissolved oxygen (Surface Water)

Dissolved oxygen is the quantity (parts per million or milligrams per liter) of oxygen in water. Dissolved oxygen concentration is primarily dependent on the amount of organic loading and water temperature. An increase of organic loading and/or water temperature in a given quantity or flow of water will result in lowered dissolved oxygen. Organic material is frequently transported in fine sediment. Therefore, a reduction in sedimentation will frequently contribute to an increase in dissolved oxygen.

14. General Airborne Sediment Effects

Airborne sediment and smoke particulate causing safety problems are generally more significant offsite than onsite because more people, vehicles, etc. will be impacted offsite by the blowing particulate or smoke than onsite.

15. Airborne Sediment (Health, Machinery and Structure)

The airborne sediment causing health problems, machinery, and structure damages is generally more significant onsite in the land unit, where effects occur 24 hours a day, than offsite along the roads and adjacent fields. However, if a large concentration of people such as farm workers picking a crop are affected offsite, or there is a subdivision immediately offsite, then the offsite health effects of airborne sediment may be more significant than onsite because of the larger number of people impacted.