Sediment and Nutrient Management Level Criteria for Conservation Effects Assessment Project (CEAP) II Analysis and Reporting

August 2022

SEDIMENT MANAGEMENT LEVEL CRITERIA

Criteria is based upon an Avoid, Control, and Trap approach to reducing losses from cropland.

1. High: At least one practice from each category, with no practice counting twice.
    a. Avoid:
        i. All crops conservation tilled
    b. Control:
        i. At least one overland flow control practice such as a terrace or contouring, or
        ii. One concentrated flow control practice such as a grassed waterway, or
        iii. A conservation crop rotation rated as “high residue” with a crop residue score of 2 or more.
    c. Trap:
        i. At least one trapping practice such as a filter or buffer, or
        ii. A field border, only if it is a minimum of 30 feet in width and intercepts flow from cropped area.
2. Moderately High: At least one practice from two of the three categories, with no practice counting twice.
    a. Avoid:
        i. All crops conservation tilled
    b. Control:
        i. At least one overland flow control practice such as a terrace or contouring, or
        ii. One concentrated flow control practice such as a grassed waterway, or
        iii. If all crops conservation tilled, a conservation crop rotation rated as “high residue” with a crop residue score of 2 or more.
    c. Trap:
        i. At least one trapping practice such as a filter or buffer, or
        ii. If control requirement is **not** met by conservation crop rotation, a field border, only if it is a minimum of 30 feet in width and intercepts flow from cropped area.
3. Moderate: At least one practice from any category.
    a. Avoid:
        i. All crops conservation tilled
    b. Control:
        i. At least one overland flow control practice such as a terrace or contouring, or

ii. One concentrated flow control practice such as a grassed waterway, or
iii. A conservation crop rotation rated as “high residue” with a crop residue score of 2 or more.

c. Trap:
i. At least one trapping practice such as a filter or buffer, or
ii. A field border, only if it is a minimum of 30 feet in width and intercepts flow from cropped area.

4. Low: No Avoid, Control or Trap Practices, no Conventional Tillage for any crop in rotation.

590 NITROGEN AND PHOSPHORUS NEED LEVEL CRITERIA

Conservation practice 590 nutrient management need levels were developed based on the likelihood of a CEAP NRI point meeting the respective loss threshold given certain point characteristics. For this classification precipitation group, the SVI leaching or runoff classification, application rate, method of application, and timing of application were considered.

A. Precipitation groups were defined as: annual rainfall <15 inches, ≥15 and <25 inches, ≥25 and <35 inches, ≥35 and <45 inches, and ≥45 inches.
B. SVI leaching and runoff groups were defined as: low, moderate, moderately high, and high.
C. Application rates were defined as:
   Nitrogen
      Low Rate: Rotational average of 75 pounds or less annually.
      Moderate Rate: Rotational average of >75 and ≤90 pounds annually.
      Moderately High Rate: Rotational average of >90 and ≤120 pounds annually.
      High Rate: Rotational average of more than 120 pounds annually.

   Phosphorus
      Low Rate: Average 20 pounds or less annually.
      Moderate Rate: Average >20 and ≤35 pounds annually.
      Moderately High Rate: Average >35 and ≤50 pounds annually.
      High Rate: Average more than 50 pounds annually.

D. Method of application was defined as:
      Incorporated: if 1) all nutrient applications were incorporated within 48 hours of application, 2) no nutrient was applied, or 3) nutrient application was applied post-plant to a winter annual or perennial crop.

      Unincorporated: if only some or none of the nutrient applications were incorporated within 48 hours of application.

E. Timing was defined as:
      Good: if 1) No fall or winter commercial fertilizer applications of nutrients occurred; however, fall manure applications are considered acceptable for all crops; 2) all commercial fertilizer/non-manure applications are acceptable for winter annuals and perennials regardless of season.

      Bad: if at least one fall or winter application of nutrients occurred; winter manure applications are not acceptable for any crop, including winter annuals and perennials.

A subsurface nitrogen loss of ≤25 pounds per acre was used as the nitrogen threshold, and a soluble phosphorus loss of ≤0.5 pound per acre was used as the phosphorus threshold. For each precipitation group, the need level was determined based on the percentage of points within the various SVI group, rate, method, and timing combinations that met the loss threshold. Combinations in which 75 percent or more of the points met the loss threshold were considered "low need." Combinations in which at least 50 percent but less than 75 percent of points met the

loss threshold were considered “moderate need.” Combinations in which less than 50 percent of points met the loss threshold were considered “high need.”

The **NITROGEN 590 need levels** were assigned as follows, taking into account SVI Leaching category, nitrogen application rate group, incorporation category, and timing category:

A. Precipitation group 1 (<15 inches annual rainfall)
    a. Low need
        i. All points within the low application rate group.
        ii. Points within the moderate application rate group that were incorporated and had either good or bad timing.
        iii. Points within the moderate application rate group that were not incorporated but had good timing.
    b. Moderate need
        i. Points within the moderate application rate group that were not incorporated and had bad timing.
        ii. All points within the moderately high application rate group.
        iii. Points within the high application rate group that were incorporated and had either good or bad timing.
    c. High need
        i. Points within the high application rate group that were not incorporated and had either good or bad timing.
B. Precipitation group 2 (≥15 and <25 inches annual rainfall)
    a. Low need
        i. All points within the low application rate group.
        ii. Points within the moderate application rate group that were incorporated and had good timing.
        iii. Points within the moderate application rate group that were incorporated, had bad timing, and categorized as low or moderate SVI Leaching.
        iv. Points within the moderate application rate group that were not incorporated, had either good or bad timing, and categorized as low or moderate SVI Leaching.
        v. All points within the moderately high application rate group and categorized as low or moderate SVI Leaching.
        vi. Points in the high application rate group that were incorporated, had good or bad timing, and categorized as low or moderate SVI Leaching.
        vii. Points in the high application rate group that were not incorporated, had good or bad timing, and categorized as low SVI Leaching.
    b. Moderate need
        i. Points within the moderate application rate group that were incorporated, had bad timing, and categorized as moderately high or high SVI leaching category.

ii. Points within the moderate application rate group that were not incorporated, had either good or bad timing, and categorized as moderately high or high SVI leaching category.
iii. All points within the moderately high application rate group and categorized as moderately high or high SVI Leaching.
iv. Points in the high application rate group that were not incorporated, had good or bad timing, and categorized as moderate SVI Leaching.
v. All points within the high application rate group and categorized as moderately high SVI Leaching.

c. High need
i. Points within the high application rate group and high SVI Leaching category.

C. Precipitation group 3 (≥25 and <35 inches annual rainfall)
a. Low need
i. All points within the low application rate group.
ii. All points in the moderate, moderately high, and high application rate groups categorized as low or moderate SVI Leaching.

b. Moderate need
i. All points in the moderate and moderately high application rate groups and categorized as moderately high or high SVI Leaching.
ii. All points in the high application rate group and categorized as moderately high SVI Leaching.

c. High need
i. All points in the high application rate group categorized as high SVI Leaching.

D. Precipitation group 4 (≥35 and <45" annual rainfall)
a. Low need
i. All points within the low application rate group.
ii. All points in the moderate application rate group categorized as low SVI Leaching.
iii. Points within the moderately high application rate group that were incorporated, had good or bad timing, and categorized a low SVI Leaching.
iv. Points within the moderate application rate group that were incorporated, had good or bad timing, and categorized as moderate or moderately high SVI Leaching.
v. Points in the moderate application rate group that were not incorporated but had good timing and categorized as moderate SVI Leaching.

b. Moderate need
i. Points within the moderate application rate group that were incorporated, had good or bad timing, and categorized as high SVI Leaching.
ii. Points in the moderate application rate group that were not incorporated, had bad timing, and are categorized as moderate SVI Leaching.

iii. Points within the moderate application rate group that are not incorporated, had good or bad timing, and categorized at moderately high or high SVI Leaching.
iv. All points within the moderately high application rate group that are categorized as moderate, moderately high, or high SVI Leaching.
v. Points within the moderately high application rate group that were not incorporated, had good or bad timing, and categorized a low SVI Leaching.
vi. Points within the high application rate group categorized as low or moderate SVI Leaching.

c. High need
    i. Points in the high application rate group and categorized as moderately high or high SVI Leaching

E. Precipitation group 5 (≥45 inches annual rainfall)
    a. Low need
        i. All points within the low and moderate application rate group categorized as low SVI Leaching.
    b. Moderate need
        i. All points within the low and moderate application rate group categorized as moderate or moderately high SVI Leaching.
        ii. Points in the low application rate group that are incorporated, had good or bad timing, and categorized as high SVI Leaching.
        iii. Points in the low application rate group that are not incorporated but had good timing and categorized as high SVI Leaching.
        iv. Points in the moderately high application rate group that are incorporated, had good or bad timing, and categorized as low, moderate, or moderately high SVI Leaching.
        v. Points in the moderately high application rate group that are not incorporated but have good timing and categorized as low or moderate SVI Leaching.
    c. High need
        i. All points in the high application rate group.
        ii. Points in the low application rate group that are not incorporated, had bad timing, and categorized as high SVI Leaching.
        iii. All points in the moderate application rate group and categorized as high SVI Leaching.
        iv. Points in the moderately high application rate group that are incorporated, had good or bad timing, and categorized as high SVI Leaching.
        v. Points in the moderately high application rate group that are not incorporated but have good timing and categorized as moderately high or high SVI Leaching.
        vi. Points in the moderately high application rate group that are not incorporated and had bad timing.

The **PHOSPHORUS 590 need levels** were assigned as follows, taking into account SVI Runoff category, phosphorus application rate group, incorporation category, and timing category:

A. Precipitation group 1 (<15 inches annual rainfall)
    a. Low need
        i. All points within the low, moderate, and moderately high application rate groups.
        ii. All points in the high application rate groups categorized as low or moderate SVI Runoff.
    b. Moderate need
        i. All points in the high application rate group categorized as moderately high or high SVI Runoff.
    c. High need
        i. No combinations were considered high need in Precipitation group 1.
B. Precipitation group 2 (≥15 and <25 inches annual rainfall)
    a. Low need
        i. All points within the low, moderate, and moderately high application rate groups.
    b. Moderate need
        i. All points within the high application rate groups.
    c. High need
        i. No combinations were considered high need in Precipitation group 2.
C. Precipitation group 3 (≥25 and <35 inches annual rainfall)
    a. Low need
        i. All points within the low and moderate application rate groups.
        ii. Points in the moderately high application rate group that are incorporated, had good or bad timing, and categorized as low, moderate, or moderately high SVI Runoff.
    b. Moderate need
        i. Points in the moderately high application rate group that are incorporated, had good or bad timing, and categorized as high SVI Runoff.
        ii. Points in the moderately high application rate group that are not incorporated and had good or bad timing.
    c. High need
        i. All points in the high application rate group.
D. Precipitation group 4 (≥35 and <45 inches annual rainfall)
    a. Low need
        i. No combinations were considered low need in Precipitation group 4.
    b. Moderate need
        i. All points within the low application rate group.
        ii. Points in the moderate application rate group that are incorporated and had good or bad timing.
        iii. Points in the moderate application rate group that are not incorporated but had good timing.

    c. High need
        i. Points in the moderate application rate group that are not incorporated and have bad timing.
        ii. All points within the moderately high and high application rate groups.

E. Precipitation group 5 (≥45 inches annual rainfall)
    a. Low need
        i. No combinations were considered low need in Precipitation group 5.
    b. Moderate need
        i. No combinations were considered moderate need in Precipitation group 5.
    c. High need
        i. All points in the low, moderate, moderately high, and high application rate groups.

Two things to keep in mind when considering Phosphorus treatment needs in areas where rainfall exceeds 35 inches include:

1. To decrease the need for nutrient management that only considers the 4Rs, conservation systems must have supporting practices that include one or more of the following: conservation crop rotation, cover crops, terraces, filter strips or buffers, or conservation tillage.
2. Beginning soil phosphorus content was not considered in this analysis, and systems that are low or moderate in soil test phosphorus may be able to meet the 0.5-pound soluble phosphorus threshold in these high rainfall areas.