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with SUPPORT FROM THE rESOURCE cONCERN tEAM AND wORKGROUPS

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**Revision History Notes**

|  |  |
| --- | --- |
| **Date** | **Summary Description** |
| 10/1/2020 | Document Version 2.1 for CART for fiscal year 2021 |
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# **Overview**

A conservation plan is a record of the client’s decisions and supporting information for treatment of a unit of land for one or more identified natural resource concerns as a result of the planning process. The plan describes the schedule of implementation for practices and activities needed to solve identified natural resource concerns and takes advantage of opportunities. The needs of the client, the resources, and Federal, State, Tribal, and local requirements will be met. Planning criteria are established for all resource concerns to provide the minimum level of treatment needed to address any particular concern.

The Conservation Assessment Ranking Tool (CART) is designed to assist conservation planners as they assess site vulnerability, existing conditions, and identify potential resource concerns on a unit of land. Although CART does not directly rely on planning criteria to assess resource concerns, it utilizes similar inputs to provide thresholds to document whether planning criteria have been achieved, or if additional conservation practices are necessary to meet them. CART results are then used to support conservation planning for the client. CART also captures this information to prioritize programs and report outcomes of NRCS investments in conservation. CART does not currently complete component plans or practice designs.

CART provides a streamlined framework to assess any of the 47 resource concerns identified by NRCS. Assessment of resource concerns is determined by the planner’s interaction with a client and considers the client’s conservation objectives. Accordingly, a planner may to choose to assess and document a subset of the 47 resource concerns consistent with the progressive planning process. CART assessment questions are not meant to document every question, criteria, and consideration that may be evaluated on a land unit. Rather, they are designed to document resource concerns and the need for conservation practices to meet the assessment threshold. No assessment can completely capture all the potential variability a conservation planner may encounter across the nation and CART is designed to document cases when a planner identifies a basis to override the CART Assessment. This override should be used when a planner can identify through observation or other assessment method that planning criteria has or has not been met, but may be outside or improperly recognized using the streamlined CART questions, information, and analysis framework designed to capture typical conditions. All information is captured on a land unit basis which allows CART to maintain this information for future planning efforts on the same operation. The aggregate data set can be used to improve future iterations of the tool.

**CART Methodologies**

CART provides a configurable system to evaluate geospatial information along with planner entered data through targeted questions. To efficiently design a system to capture the data and utilize it for multiple purposes, a point system framework was developed. Every field is evaluated for key intrinsic site characteristics, when applicable, which affect each resource concern. A threshold score is set which is intended to represent the effort needed to attain a target-level of resource conservation using conservation management and conservation practices. Sites are then evaluated for existing management and conservation efforts (known as the “existing condition”) and compared to the threshold to determine what level of conservation effort is needed.

When existing condition points + Planned Practice points < Threshold: more conservation is needed.

When existing condition points + Planned Practice points ≥Threshold: conservation goal is met.

To combine the many tools and methods in the assessment into a streamlined evaluation, the numerous existing methods needed to be modified to fit the point system to allow for streamlined and efficient capture of the planner’s observations and site data. This was not intended to change the expected outcome of planning on a given land unit, but does quantify many of the observations and documents them in a single compatible system which can be used for planning, ranking, outcomes reporting, and environmental assessment.

In general, resource concerns fall into one of three categories for the assessment method used to assess and document a resource concern:

* Client Input/Planner Observation
* Procedural/Deductive
* Predictive

**Client Input/Planner Observation:** Many of the resource concerns fall into this category. Within the CART system, to the extent possible, a streamlined choice list or list of options will be presented to the planner to document the client input and/or planner observation. These observations will then be compared against the threshold. The majority of Client Input or Planner Observation resource concerns will have a CART system threshold of 50. If the existing condition choice is below 50, then the assessment threshold is not met. Likewise, if the existing condition choice is at or above 50, then the assessment threshold is met. In some cases, geospatial interpretations will be available to help set a threshold. In these situations, the variable threshold attempts to communicate a higher risk or priority for this site, which is likely to require additional conservation to address to the threshold and also communicate additional priority to ranking and the environmental assessment.

**Procedural/Deductive**: A large group of the remaining resource concerns fall into this category and either reference a tool which consists of an inventory which leads to a determination or have a list of inventory-like criteria in the assessment write-up. Within the CART system, to the extent possible, a streamlined choice list which either replicates or approximate the data captured in the referenced tools is incorporated. Because of the local variability in state tools, these choices will be broad in nature to allow states to more carefully align them with State conditions. As above, many of these have a set threshold of 50, but may have variable thresholds for the same reasons as above.

**Predictive:** The remaining group of resource concerns are assessed using some sort of predictive interactive model simulation. The CART system attempts to replicate the outcomes related to the assessment threshold being met or not compared to the model outputs. Most of these have variable thresholds related to the intrinsic site conditions which reflect significant impacts on the model outputs.

**Conservation Practices and Activities:** After identifying resource concerns and answers to existing condition questions, existing and planned conservation practices and activities can be added to the existing condition to determine the state of the management system. Supporting practices may be necessary to support the conservation practices and activities, and will be identified as necessary supporting practices, but do not add conservation management points to the total. A comprehensive list of Conservation Practices and Activities and their points towards addressing each resource concern by land use is available as an attachment to this document.

Table 1: NRCS Resource Concerns

| SWAPA +E Categories | NRCS Resource Concerns |
| --- | --- |
| Soil | 1. Sheet and rill erosion |
| 2. Wind erosion |
| 3. Ephemeral gully erosion |
| 4. Classic gully erosion |
| 5. Bank erosion from streams, shorelines, or water conveyance channels |
| 6. Subsidence |
| 7. Compaction |
| 8. Organic matter depletion |
| 9. Concentration of salts or other chemicals |
| 10. Soil organism habitat loss or degradation |
| 11. Aggregate instability |
| Water | 12. Ponding and flooding |
| 13. Seasonal high water table |
| 14. Seeps |
| 15. Drifted snow |
| 16. Surface water depletion |
| 17. Groundwater depletion |
| 18. Naturally available moisture use |
| 19. Inefficient irrigation water use |
| 20. Nutrients transported to surface water |
| 21. Nutrients transported to groundwater |
| 22. Pesticides transported to surface water |
| 23. Pesticides transported to groundwater |
| 24. Pathogens and chemicals from manure, biosolids, or compost applications transported to surface water |
| 25. Pathogens and chemicals from manure, biosolids, or compost applications transported to groundwater |
| 26. Salts transported to surface water |
| 27. Salts transported to groundwater |
| 28. Petroleum, heavy metals, and other pollutants transported to surface water |
| 29. Petroleum, heavy metals, and other pollutants transported to groundwater |
| 30. Sediment transported to surface water |

|  | 31. Elevated water temperature |
| --- | --- |
| Air | 32. Emissions of particulate matter (PM) and PM precursors |
| 33. Emissions of greenhouse gasses (GHGs) |
| 34. Emissions of ozone precursors |
| 35. Objectionable odors |
| 36. Emissions of airborne reactive nitrogen |
| Plants | 37. Plant productivity and health |
| 38. Plant structure and composition |
| 39. Plant pest pressure |
| 40. Wildfire hazard from biomass accumulation |
| Animals | 41. Terrestrial habitat for wildlife and invertebrates |
| 42. Aquatic habitat for fish and other organisms |
| 43. Feed and forage imbalance |
| 44. Inadequate livestock shelter |
| 45. Inadequate livestock water quantity, quality and distribution |
| Energy | 46. Energy efficiency of equipment and facilities |
| 47. Energy efficiency of farming/ranching practices and field operations |

# **Preliminary Inventory information**

Several preliminary inventory questions in CART will be asked which will inform other resource assessment questions specific to resource concerns. For example, if “yes” is identified for “Livestock present on the PLU?” then planners will be asked questions regarding animal species and numbers. However, if “no” is identified for the first question then the dependent questions will not be asked. In addition, land use specific questions will only be asked for the applicable land uses and modifiers. For example, planners will only be asked to identify the crop group if the PLU they are completing the assessment for is categorized as cropland.

Table 2*: Does a surface water feature exist within the PLU?*

*\* Note: This question is answered by selecting the Water Feature PLU modifier.*

|  |
| --- |
| Answer |
| Yes |
| No |

Table 3*: Type of surface water feature in the PLU?*

*Question Hover text: Proximity of the WF to the PLU and its consideration of the need to assess will be left to the discretion of the planner. For instance, a stream could be within, adjacent to, or near the PLU and there could be planning and assessment considerations associated to the proximity.*

Note: Multiple water features can be selected. This question is required if Water Feature is selected as a land use modifier.

|  |
| --- |
| Answer |
| Lake or Pond |
| River |
| Seep |
| Spring |
| Stream |
| Water Conveyance Channel |
| Wetland |

Table 4*: Furrow Irrigation*

Note: This appears as a check box available for selection if Irrigated is selected as land use modifier.

|  |
| --- |
| Answer |
| Yes |
| No |

Table 5*: Irrigation Amount (inches per acre per year)*

Note: An amount must be entered in a numeric entry box if Irrigated is selected as a land use modifier.

|  |
| --- |
| Answer |
| <12 |
| 12 – 23.9 |
| 24 – 35.9 |
| 36 |

Table 6*: Livestock present on the PLU?*

|  |
| --- |
| Answer |
| Yes |
| No |

Table 7*: Primary Species*

|  |
| --- |
| Answer |
| Cattle Beef Cow/Calf |
| Cattle Beef Stocker |
| Dairy cows/heifers |
| Dry cows |
| Goats |
| Horses |
| Poultry |
| Sheep |
| Swine |
| Aquaculture |
| Honey Bees |
| Bison |
| Deer |
| Elk |
| Llamas |
| Mules |
| Rabbits |
| Turkeys |
| Alpacas |
| Emu |
| Fish |
| Ratites |
| Other Livestock |

Table 8*: Animal Numbers*

|  |
| --- |
| Answer |
| 1-10 |
| 11-100 |
| 101-300 |
| 301-1,000 |
| 1,001-5,000 |
| 5,001-10,000 |
| 10,001-100,000 |
| >100,000 |

Table 9:  *Crop Group*

|  |
| --- |
| Answer |
| Unknown |
| Orchards, vineyards, berries and nut crops |
| Vegetable Crops |
| Cotton |
| Seed crops |
| Flooded rice and cranberry crops |
| Turfgrass for sod and nursery crops |
| Close grown crops - residue not harvested |
| Close grown crops – residue removed |
| Row crops – durable residue not harvested |
| Row crops - residue removed or fragile |
| Christmas trees |
| Hay crops - forage |

Table 10:  *Range Group*

|  |
| --- |
| Answer |
| Natural Grasslands |
| Savannas |
| Most Deserts |
| Tundra |
| Alpine Plant Communities |
| Coastal and Freshwater Marshes |
| Wet Meadows |
| Shrublands |

Table 11:  *Pasture Group*

|  |
| --- |
| Answer |
| Warm Season Grasses |
| Cool Season Grasses |

Table 12:  *Forest Group*

|  |
| --- |
| Answer |
| 100 White/Red/Jack Pine group |
| 120 Spruce/Fir group |
| 140 Longleaf/Slash Pine group |
| 150 Tropical softwoods group |
| 160 Loblolly/Shortleaf Pine group |
| 170 Other eastern softwoods group |
| 180 Pinyon/Juniper group |
| 200 Douglas-fir group |
| 220 Ponderosa Pine group |
| 240 Western White Pine group |
| 260 Fir/Spruce/Mountain Hemlock group |
| 280 Lodgepole Pine group |
| 300 Hemlock/Sitka Spruce group |
| 320 Western Larch group |
| 340 Redwood group |
| 360 Other Western Softwood group |
| 370 California Mixed Conifer group |
| 380 Exotic Softwoods group |
| 390 Other softwood group |
| 400 Oak/Pine group |
| 500 Oak/Hickory group |
| 600 Oak/Gum/Cypress group |
| 700 Elm/Ash/Cottonwood group |
| 800 Maple/Beech/Birch group |
| 900 Aspen/Birch group |
| 910 Alder/Maple group |
| 920 Western Oak group |
| 940 Tanoak/Laurel group |
| 950 Other Western Hardwoods group |
| 960 Other Hardwood group |
| 970 Woodland Hardwoods group |
| 980 Tropical Hardwoods group |
| 988 Cloud Forest |
| 990 Exotic Hardwoods group |
| 999 Nonstocked |

# **Soil**

## **Sheet and Rill Erosion**

### Component: Sheet and rill erosion

**Description:** Detachment and transport of soil particles caused by rainfall, melting snow, or irrigation.

**Objective:** Reduce sheet and rill erosion to T.

**Analysis within CART:**

**Crop**

Each planned land unit (PLU) designated as cropland will have a calculated PLU Erodibility Index - water (EIwt) (see equation 1 below) calculated for all major map units in the PLU. The Dominant Critical (EIwt) will be categorized into four soil erodibility potentials through the Conservation Resource Web Services – PLU Modified Erodibility Potential-Water. The service utilizes the NRCS published soils database (SSURGO) according to equations 1 and 2.

Equation 1: EIwt = K\*(LS)/T

K is the soil erodibility factor of the surface horizon. K is obtained from the SSURGO data base data element for soil erodibility factor (chorizon.kffact).

LS is derived from a simplification of the original LS calculation of Wischmeier and Smith (1978). This simplification by Stone and Hilborn (2012) removes the need for trigonometric functions in the LS calculation.

Equation 2: LS = [0.065 + 0.0456 (slope) + 0.006541 (slope)2] (slope length ÷ constant) NN

Where:   
slope = slope steepness in percent from the representative slope in SSURGO (component.slope\_r).  
  
slope length = length of slope in m (ft) calculated using “default slope parameters” created by Lightle and Weesies (1998, data not shown) using the representative slope in SSURGO (component.slope\_r).

constant = 22.1 metric (72.5 Imperial)

NN is derived from the slope. For slopes <1, NN = 0.2; for slopes equal to 1 and less than 3, NN = 0.3; for slopes equal to three and less than 5, NN = 0.4; for slopes equal to and greater than 5, NN = 0.5

T is the soil loss tolerance factor for the component. T is obtained from the SSURGO data base data element for the soil loss tolerance factor (component.tfact).

The EIwt will be selected for each PLU by:

1. Using Equation 1 to calculate EIwt for all major map units in the PLU.
2. Sorting the major soil components from the most critical to the least critical.
3. Determining the area in acres of each soil component. Major soil components would be normalized to equal 100%, once minor components are removed, to account for total PLU acres.
4. Sequentially adding the soil component areas starting with the most critical to produce the cumulative area of that component and all more at-risk components, and;
5. Selecting the first component in which the cumulative area represents at least 10% (20% if less than 20 acres) of the field.

Table 13: *PLU Modified Erodibility Potential – Water (EIw) Categories.*

|  |
| --- |
| PLU Modified Erodibility Potential – Water (EIwt) |
| High (≥0.20) |
| Moderately High (≥0.10 – <0.20) |
| Moderate (≥0.05 – <0.10) |
| Low (<0.05) |

Using the R factor from digitized map of R factor classes (via a web service) and the EIwt of the dominant critical soil the threshold of conservation management points necessary can be determined in Table 14 and modified by irrigation amount and type in Table 15.

Table 14:  *Determining Sheet and Rill Erosion Threshold*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PLU Modified Erodibility Potential – Water (EIwt) | R Factor | | | |
| ≤50 | >50-150 | >150-250 | >250 |
| High | 30 | 40 | 60 | 80 |
| Moderately High | 20 | 30 | 50 | 60 |
| Moderate | 10 | 20 | 40 | 50 |
| Low | 10 | 10 | 20 | 40 |

**Irrigation Adjustment:**

Table 15: *Irrigation R Factor Adjustment*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Irrigation R Factor Adjustment** | | | | |
| R Factor Modification | R Factor Class  Inches Per Acre Per Year | | | |
| ≤50 | >50 – 150 | >150 – 250 | >250 |
| Move 1 Class Higher | 12 to 23.9 | 12 to 23.9 | ≥12 | N/A |
| Move 2 Classes Higher | 24 to 35.9 | ≥24 | N/A | N/A |
| Move 3 Classes Higher | ≥36 | N/A | N/A | N/A |
| \* Cannot move class higher than “>250” | | | | |

**If yes is selected for furrow irrigation, R factor modification is >250.**

The existing condition Crop Rotation Cover/Residue/Biomass Creditquestion will set the existing score as seen in Table 16. Note: This question, like others, is only asked once in CART but points will be assigned to multiple resource concerns as appropriate.

Table 16: *Crop Rotation Cover/Residue/Biomass Credit*

|  |  |
| --- | --- |
| **Existing Condition - Crop Rotation Credits** Existing condition credits are based on system benefits for cover/residue/biomass of all crops and cover crops in the rotation combined with the effects of harvesting, grazing and tillage. ***Note that individual points for associated practices like crop rotation, cover crop and residue management are added in addition to this system level credit.***  Bulleted items are intended to be used as a guide to the current organic matter condition. Additional State guidance may be required. | Sheet and Rill Erosion Points |
| **None – Rapidly Depleting Soil Organic Matter**   * Fallow (bare or chemical fallow) for significant portions of the management system * Crops with fragile residue * Multiple full-width tillage passes | 0 |
| **Low – Depleting Soil Organic Matter**   * A mix of crops with fragile and non-fragile residue * Partial width or limited full-width tillage | 5 |
| **Moderate – Maintaining Soil Organic Matter**   * Crop rotations with predominately non-fragile residue * May include cover crops * Part of the rotation in high residue crops * No full-width tillage or tillage passes minimize soil disturbance | 15 |
| **High – Building Soil Organic Matter**   * Crop rotations with high residue crops * Includes cover crops or perennial crops (including hay and green manures) with full ground cover * Not tilled or tilled infrequently during the rotation | 40 |

**Associated Agriculture Land, Developed Land, Farmstead, Forest**

If the Resource concern component is applicable the planner will identify this resource concern based on site-specific conditions. A threshold value of 50 will be set and the existing condition question will be triggered. The existing condition question will set the existing score as seen in Table 17.

Table 17: *Sheet and Rill Erosion Existing Condition*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Site is stable and without visible signs of active erosion. | 51 |
| Site is NOT stable and has visible signs of active erosion. | 1 |

**Pasture**

For Pasture land uses, a standard threshold of 50 is set. This component will be addressed by answering the Pasture Condition Score Sheet (PCS) existing condition questions in Table 18, Table 19, and Table 20.

Table 18: *Pasture - Plant Vigor*

*Question hover text: Established using Pasture Condition Score Sheet for Plant Vigor OR determining Indicators of Pasture Health (DIPH) for Plant Vigor*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| High | 20 | * Rapid recovery of desirable forage. All healthy green forage. * Pasture Condition Score element score = 5   OR   * DIPH Rating = None to slight departure for Plant Vigor Indicator #17 |
| Good | 17 | * Good recovery of desirable forage. Light green and dark green forage present. * Pasture Condition Score element score = 4   OR   * DIPH Rating = Slight to moderate departure for Plant Vigor Indicator #17 |
| Fair | 10 | * Adequate recovery of desirable forage. Yellowish and dark green areas due to manure and urine patches. * Pasture Condition Score element score = 3   OR   * DIPH Rating = Moderate departure for Plant Vigor Indicator #17 |
| Low | 5 | * Some recovery. Yellowish green forage, or moderately or sight stunting of desirable forage. * Pasture Condition Score element score = 2   OR   * DIPH Rating = Moderate to extreme departure for Plant Vigor Indicator #17 |
| Poor | 1 | * No plant recovery after grazing/harvest. Pale, yellow or brown, or severe stunting of desirable forage. * Pasture Condition Score element score = 1   OR   * DIPH Rating = Extreme to total departure for Plant Vigor Indicator #17 |

Table 19: *Pasture – Plant Cover*

*Question hover text: Pasture Condition Score Live or Dormant Plant Cover or Determining Indicators of Pasture Health (DIPH)*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| High | 20 | * More than 95% live (non-dormant) leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 5   OR   * DIPH Rating = None to slight departure for Live Plant Foliar Cover Indicator #12 |
| Good | 17 | * 81-95% live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 4   OR   * DIPH Rating = Slight to moderate departure for Live Plant Foliar Cover Indicator #12 |
| Fair | 10 | * 66-80% live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 3   OR   * DIPH Rating = Moderate departure for Live Plant Foliar Cover Indicator #12 |
| Low | 5 | * 40-65% is live leaf canopy Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 2   OR   * DIPH Rating = Moderate to extreme departure for Live Plant Foliar Cover Indicator #12 |
| Poor | 1 | * Less than 40% is live leaf canopy. Remaining is either dead standing material, or bare ground.   Pasture Condition Score element score = 1  OR   * DIPH Rating = Extreme to total departure for Live Plant Foliar Cover Indicator #12 |

Table 20: *Pasture – Erosion*

*Question hover text: Pasture Condition Score Sheet for Erosion OR Determining Indicators of Pasture Health (DIPH) for Erosion*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| High | 20 | * Sheet and Rill: Plant density high, no runoff, good infiltration. No evidence of present or past erosion. * Pasture Condition Score element score = 5   OR   * DIPH Rating = None to slight departure for Erosion (sheet and rill) Indicator #1 |
| Good | 17 | * Sheet and Rill: Plant density high, runoff low, good infiltration. May have evidence of past erosion if present. * Pasture Condition Score element score = 4   OR   * DIPH Rating = Slight to moderate departure for Erosion (sheet and rill) Indicator #1 |
| Fair | 10 | * Sheet and Rill: Plant density good and runoff moderate. If present, erosion concentrated on heavily used areas. * Pasture Condition Score element score = 3   OR   * DIPH Rating = Moderate departure for Erosion (sheet and rill) Indicator #1 |
| Low | 5 | * Sheet and Rill: Plant density slows runoff. Erosion present and easily seen on steeper terrain. * Pasture Condition Score element score = 2   OR   * DIPH Rating = Moderate to extreme departure for Erosion (sheet and rill) Indicator #1 |
| Poor | 1 | * Sheet and Rill: Plant density is insufficient to stop runoff and poor infiltration. Erosion easily visible throughout pasture. * Pasture Condition Score element score = 1   OR   * DIPH Rating = Extreme to total departure for Erosion (sheet and rill) Indicator #1 |

**Range**

For Range land uses, a standard threshold of 50 is set. This component will be addressed by answering the Interpreting Indicators of Rangeland Health (IIRH) question in Table 21.

Table 21: *Rangeland Health - Soil/Site Stability Limitations*

*Question hover text: Hydrologic Function Attributes and Rills Indicator #1*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| None to Slight | 50 | Interpreting Indicators of Rangeland Health (most current version) |
| Slight to Moderate | 40 | Interpreting Indicators of Rangeland Health (most current version) |
| Moderate | 30 | Interpreting Indicators of Rangeland Health (most current version) |
| Moderate to Extreme | 15 | Interpreting Indicators of Rangeland Health (most current version) |
| Extreme to Total | 1 | Interpreting Indicators of Rangeland Health (most current version) |

## **Wind Erosion**

### Component: Wind erosion

**Description:** Detachment and transport of soil particles caused by wind.

**Objective:** Reduce wind erosion to T.

**Analysis within CART:**

**Crop**

Each PLU for crop will have the PLU soil wind erosion potential determined based on the dominant critical major map unit as described below. The (EPwd) will be categorized into four soil erodibility potentials through the Conservation Resource Web Services – PLU Modified Erodibility Potential-Wind (EPwd). The service utilizes the NRCS-published soils database (SSURGO).

The Stewardship Tool for Environmental Performance (STEP) PLU Erodibility Potential – Wind for a PLU is calculated as

EPwd= C\*I/T

Where:

C Factor (Wind erosion climatic factor). Using geolocation, the C Factor is obtained established from a digitized C Factor map. In the future, a better estimation of a wind energy utilizing the climate data used in WEPS may be investigated.

I Factor (soil erodibility factor – wind) of the surface horizon The I factor is obtained from the SSURGO data base data element for wind erodibility index (component.wei).

T is the soil loss tolerance factor for the component. T is obtained from the SSURGO data base data element for the soil loss tolerance factor (component.tfact).

The EPwd will be selected for each PLU by:

1. Using the equation EPwd= C\*I/T on all major map units in the PLU.
2. Sorting the major soil components from the most critical to the least critical.
3. Determining the area in acres of each soil component. Major soil components would be normalized to equal 100%, once minor components are removed, to account for total PLU acres.
4. Sequentially adding the soil component areas starting with the most critical to produce the cumulative area of that component and all more at-risk components, and;

Selecting the first component in which the cumulative area represents at least 10% (20% if less than 20 acres) of the field.

Table 22*: Determining Wind Erosion Vulnerability*

|  |  |
| --- | --- |
| Wind Erosion Vulnerability (Based on C\*I/T) | Threshold |
| High (≥16) | 80 |
| Moderately High (≥8 to <16) | 50 |
| Moderate (≥4 to <8) | 20 |
| Low (<4) | 10 |

**Irrigation Adjustment to Threshold:**

If the PLU is irrigated, the I value used for the calculation will be lowered by one I factor for factors that are 180 or less.

The existing condition question will set the existing score as seen in Table 23.

Table 23*: Crop Rotation Cover/Residue/Biomass Credit*

|  |  |
| --- | --- |
| **Existing Condition - Crop Rotation Credits** Existing condition credits are based on system benefits for cover/residue/biomass of all crops and cover crops in the rotation combined with the effects of harvesting, grazing and tillage. ***Note that individual points for associated practices like crop rotation, cover crop and residue management are added in addition to this system level credit.***  Bulleted items are intended to be used as a guide to the current organic matter condition. Additional State guidance may be required. | Wind Erosion Points |
| **None – Rapidly Depleting Soil Organic Matter**   * Fallow (bare or chemical fallow) for significant portions of the management system * Crops with fragile residue * Multiple full-width tillage passes | 0 |
| **Low – Depleting Soil Organic Matter**   * A mix of crops with fragile and non-fragile residue * Partial width or limited full-width tillage | 5 |
| **Moderate – Maintaining Soil Organic Matter**   * Crop rotations with predominately non-fragile residue * May include cover crops * Part of the rotation in high residue crops * No full-width tillage or tillage passes minimize soil disturbance | 15 |
| **High – Building Soil Organic Matter**   * Crop rotations with high residue crops * Includes cover crops or perennial crops (including hay and green manures) with full ground cover * Not tilled or tilled infrequently during the rotation | 40 |

**Associated Agriculture Land, Developed Land, Farmstead, Forest, Other Rural Land**

If the resource concern component is applicable, the planner will identify this resource concern based on site-specific conditions. A threshold value of 50 will be set and the existing condition question will be triggered. The existing condition question will set the existing score as seen in **Error! Reference source not found.**.

Table 24*: Wind Erosion Existing Condition*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Site is stable and without visible signs of active erosion | 51 |
| Site is NOT stable and has visible signs of active erosion | 1 |

**Pasture**

For Pasture land uses, a standard threshold of 50 is set. This component will be addressed by answering the PCS existing condition questions in Table 25 and

Table 26.

Table 25: *Pasture – Plant Cover*

*Question hover text: Pasture Condition Score Sheet – Live or Dormant Plant Cover OR Determining Indicators of Pasture Health (DIPH) – Live Plant Foliar Cover*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| High | 32 | * More than 95% live (non-dormant) leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 5   OR   * DIPH Rating = None to slight departure for Live Plant Foliar Cover Indicator #12 |
| Good | 30 | * 81-95% live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 4   OR   * DIPH Rating = Slight to moderate departure for Live Plant Foliar Cover Indicator #12 |
| Fair | 26 | * 66-80% live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 3   OR   * DIPH Rating = Moderate departure for Live Plant Foliar Cover Indicator #12 |
| Low | 10 | * 40-65% is live leaf canopy Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 2   OR   * DIPH Rating = Moderate to extreme departure for Live Plant Foliar Cover Indicator #12 |
| Poor | 1 | * Less than 40% is live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 1   OR   * DIPH Rating = Extreme to total departure for Live Plant Foliar Cover Indicator #12 |

Table 26: *Pasture – Erosion*

*Question hover text: Pasture Condition Score Sheet for Erosion OR Determining Indicators of Pasture Health (DIPH) for Erosion*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| High | 32 | * Wind: No exposed soil. * Pasture Condition Score element score = 5   OR   * DIPH Rating = None to Slight departure for Erosion Wind Scoured and/or Depositional Areas Indicator #3 |
| Good | 30 | * Wind: Minimal soil exposed, some detached vegetation wind rolled, minor plant damage. * Pasture Condition Score element score = 4   OR   * DIPH Rating = Slight to Moderate departure for Erosion Wind Scoured and/or Depositional Areas Indicator #3 |
| Fair | 26 | * Wind: Occasional scoured areas, litter wind rolled. * Pasture Condition Score element score = 3   OR   * DIPH Rating = Moderate departure for Erosion Wind Scoured and/or Depositional Areas Indicator #3 |
| Low | 10 | * Wind: Scoured areas common, deposition affecting plants. * Pasture Condition Score element score = 2   OR   * DIPH Rating = Moderate to Extreme departure for Erosion Wind Scoured and/or Depositional Areas Indicator #3 |
| Poor | 1 | * Wind: Severe scoured areas and deposition throughout. * Pasture Condition Score element score = 1   OR   * DIPH Rating = Extreme to total departure for Erosion Wind Scoured and/or Depositional Areas Indicator #3 |

**Range**

For Range land uses, a standard threshold of 50 is set. This component will be addressed by answering the question in Table 27.

Table 27: *Rangeland Health - Soil/Site Stability Limitations*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| None to Slight | 50 | Interpreting Indicators of Rangeland Health (most current version) |
| Slight to Moderate | 40 | Interpreting Indicators of Rangeland Health (most current version) |
| Moderate | 30 | Interpreting Indicators of Rangeland Health (most current version) |
| Moderate to Extreme | 15 | Interpreting Indicators of Rangeland Health (most current version) |
| Extreme to Total | 1 | Interpreting Indicators of Rangeland Health (most current version) |

## **Ephemeral Gully Erosion**

### Component: Ephemeral gully erosion

**Description:** Soil erosion that results in small gullies in the same flow area that can be obscured by tillage.

**Objective:** Control the formation of ephemeral gullies.

**Analysis within CART:**

**Crop, Pasture**

The planner will identify this resource concern based on aerial maps, site-specific conditions and any state provided guidance on how to determine if this resource concern exists. A threshold value of 50 will be set and the existing condition questions will be triggered. The existing condition question will set the existing score as seen in Table 28.

In the future, geospatial layers such as lidar-based maps may be used in to identify potential locations where ephemeral gullies may occur.

Table 28*: Ephemeral Gully Erosion Existing Condition*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| No ephemeral gullies observed | 51 |
| Ephemeral gullies are observed | 1 |

## **Classic Gully Erosion**

### Component: Classic gully erosion

**Description:** Gullies created by runoff that can enlarge a channel progressively by head cutting, lateral widening.

**Objective:** Stabilize an actively eroding gully.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

The planner will identify this resource concern based on site-specific conditions, a threshold value of 50 will be set, and existing condition questions will be triggered. The existing condition question will set the existing score as seen in Table 29.

In the future, potential for lidar-based maps to identify potential locations where classic gully erosion may occur.

Table 29*: Classic Gully Erosion Existing Condition*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| No active gully erosion observed | 51 |
| Active gully erosion is observed | 1 |

## **Bank Erosion from Streams, Shorelines, or Water Conveyance Channels**

### Component: Bank erosion from streams, shorelines, or water conveyance channels

**Description:** Erosion resulting from poor land management practices upstream such as reduced soil infiltration water holding capacity, storm events, wave action, rain, ice, wind, runoff, loss of vegetation, hydrologic dynamics, stream isolation from floodplains, other disturbed or altered geomorphological processes.

**Objective:** Restore the stability of eroding banks.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water**

If a water feature land use modifier is selected, the planner will be required to identify the type of water feature that exists. In the future, geospatial layers may be used in the future to indicate blue line streams or state specified stream designations and other water features such as ponds.

The planner will then be required to identify the bank condition. The existing bank condition will be classified into four categories as identified in Table 30. The threshold value of 50 is equivalent to a moderately stable bank. This is consistent with the planning criteria that requires that *Element 3 Bank Condition* in the Stream Visual Assessment Protocol 2 (SVAP2) be at least moderately stable. Although SVAP2 is not used to assess erosion on shorelines or water conveyance channels, the same general bank conditions should be used to determine the threshold.

Table 30*: Bank Erosion Existing Condition*

|  |  |
| --- | --- |
| Answer | Conservation Management Points |
| Stable | 60 |
| Moderately stable | 51 |
| Moderately unstable | 25 |
| Unstable | 1 |

## **Subsidence**

### Component: Subsidence

**Description:** Loss of volume and depth of organic soils due to oxidation caused by above normal microbial activity resulting from excessive water drainage, soil disturbance, or extended drought. This excludes karst, sinkholes, and issues or depressions caused by underground activities. This resource concern is only applicable when the soil is a histosol.

**Objective:** Reduce potential for subsidence to occur and treat existing subsidence.

**Analysis within CART:**

**Crop, Forest, Range, Pasture, Farmstead, Developed Land, Associated Agriculture Land, Other Rural Land**

Oxidation of organic matter, by introduction of conditions favorable to development of aerobic organisms causes subsidence and may negatively affect the intended land use.

If the planner determines assessment of the resource concern will occur, a Soil Data Access (Agricultural Organic Soil Subsidence Interpretation, <https://jneme910.github.io/CART/chapters/Agricultural_Organic_Soil_Subsidence>) web service will be used to determine the percentage of organic soils in the PLU. The Soil Data Access services utilizes the NRCS published soils database (SSURGO). The service request calculates the rolling sum values for rating acres and rating percent for each resource concern and finds the single most limiting rating (per land unit) that comprises at least 10% by area or 10 acres, or 20% when less than 20 acres**.** A threshold value, based on the webservice, will be set as determined in Table 31.  The existing condition score will be set based on the answer a user selects, as shown in Table 32. Points for existing conservation practices (historical and observed, functional) are added to the existing condition score to determine the existing condition total score.

Table 31*: Threshold - Subsidence*

|  |  |  |
| --- | --- | --- |
| Answer | Subsidence Vulnerability Points | Definition |
| Soil has severe to moderate vulnerability to subsidence | 50 | The soil has features that are vulnerable to subsidence. |
| Soils rated “low subsidence” or “mineral soil” | 0 | "Low subsidence" indicates that the soil has one or more features that are unfavorable for aerobic soil organisms. With careful management, the soil can be used for crop production and be nearly sustainable. Soils that are not organic are rated "Mineral soil" that do not subside due to organic matter oxidation. |

Table 32*: Existing Condition – Subsidence*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Subsidence impairs the intended land use | 1 |
| Organic soil-building conditions have been restored | 51 |

## **Compaction**

### Component: Compaction

**Description:**  Management-induced soil compaction at any level throughout the soil profile resulting in reduced plant productivity, biological activity, infiltration, aeration, or some combination of these.

**Objective:** Reduce potential for compaction to occur and treat existing compaction.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

If the planner selects this resource concern component for assessment, a Soil Data Access (Soil Susceptibility to Compaction Interpretation, <https://jneme910.github.io/CART/chapters/Soil_Susceptibility_to_Compaction>) webservice will be used to determine the percentage of soils with inherent susceptibility to compaction. The Soil Data Access services utilizes the NRCS-published soils database (SSURGO). The service request calculates the rolling sum values for rating acres and rating percent for each resource concern and finds the single most limiting rating (per land unit) that comprises **at least 10% by area or 10 acres, or 20% when less than 20 acres.** A threshold value, based on the webservice, will be set as determined in Table 33.  The existing condition score will be set based on the answer a user selects, as shown in Table 34. Points for existing conservation practices (historical and observed, functional) are added to the existing condition score to determine the existing condition total score.

Table 33*: Threshold - Compaction*

|  |  |  |
| --- | --- | --- |
| Answer | Threshold | Definition |
| High potential | 50 | High – The potential for compaction is significant.  The growth rate of seedlings will be reduced following compaction.  After initial compaction, this soil is still able to support standard equipment, but will continue to compact with each subsequent pass.  The soil is moisture sensitive, exhibiting large changes in density with changing moisture content. |
| Medium potential | 30 | Medium – The potential for compaction is significant.  The growth rate of seedlings may be reduced following compaction.  After the initial compaction (i.e., the first equipment pass), this soil can support standard equipment with only minimal increases in soil density.  The soil is intermediate between moisture insensitive and moisture sensitive. |
| Low potential | 1 | Low – The potential for compaction is insignificant.  This soil can support standard equipment with minimal compaction. The soil is moisture insensitive, exhibiting only small changes in density with changing moisture content. |

Table 34*: Existing Condition - Compaction*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference/explanatory information |
| Compaction is significant | 0 | **Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land**   * Evidence of compaction, such as ponding, stunted plant growth, or root growth limitation is observed.   AND   * Penetrometer rating, when the soil is moist throughout the rating depth, is greater than 150 psi within top 6” depth and greater than 300 in 6-18” depth;   OR   * State-modified In-Field Soil Health Assessment Worksheet based on the national template indicates a compaction resource concern occurs.   **Range**   * Interpreting Indicators of Rangeland Health indicates Soil Site Stability is slight to moderate, or greater departure.   AND   * Hydrologic Function is slight to moderate, or greater departure.   OR   * Compaction Indicator 11 is slight to moderate, or greater departure.   OR   * Evidence of compaction, such as ponding, stunted plant growth, or root growth limitation is observed.   **Pasture**   * Determining Indicators of Pasture Health (DIPH) Soil/Site Stability attribute is slight to moderate, or greater departure.   AND   * DIPH Hydrologic Function attribute is slight to moderate or greater departure.   OR   * DIPH Compaction Layer indicator 11 is slight to moderate, or greater departure.   -OR-   * Pasture Condition Scoresheet (PCS) Soil Compaction and Soil Regenerative Features element is 3 or lower. |
| Compaction is not significant | 51 | **Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land**   * No evidence of compaction, such as ponding, stunted plant growth, or root growth limitation is observed.   AND   * Penetrometer rating, when the soil is moist throughout the rating depth, is less than 150 psi within top 6” depth and less than 300 in 6-18” depth;   OR   * State-modified In-Field Soil Health Assessment Worksheet based on the national template indicates a no compaction resource concern occurs.   **Range**  Interpreting Indicators of Rangeland Health indicates:   * Soil Site Stability: slight to moderate or less   AND   * Hydrologic Function: slight to moderate or less   OR   * Compaction Indicator 11 slight to moderate or less.   OR   * No observed evidence of compaction, such as ponding, stunted plant growth, or root growth limitation.   **Pasture**   * Determining Indicators of Pasture Health (DIPH) Soil/Site Stability is None to Slight departure.   AND   * DIPH Hydrologic Function attribute is None to Slight departure.   OR   * DIPH Compaction Layer indicator 11 is None to Slight departure.   -OR-   * Pasture Condition Score Sheet use indicates Soil Compaction and Soil Regenerative Features element 4 or higher. |

## **Organic Matter Depletion**

### Component: Organic matter depletion

**Description:** Management-induced depletion of any or all pools of soil organic matter resulting in limited soil function and processes that support plant productivity, biological activity, water and nutrient cycling, or some combination of these.

**Objective:** Maintain, increase, or improve soil organic matter.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

If the planner selects this resource concern component for assessment, a Soil Data Access (Agricultural Organic Matter Depletion Interpretation, <https://jneme910.github.io/CART/chapters/Organic_Matter_Depletion>) webservice will be used to determine the percentage of soils susceptible to organic matter depletion in the PLU. The webservice utilizes the NRCS published soils database (SSURGO). The webservice request calculates the rolling sum values for rating acres and rating percent for each resource concern and finds the single most limiting rating (per land unit) that comprises **at least 10% by area or 10 acres, or 20% when less than 20 acres.** The threshold is set based on

Table 35. The existing condition score will be set based on the answer a user selects, as shown in Table 36, Table 37, Table 38, and Table 39 Points for existing conservation practices (historical and observed, functional) are added to the existing condition score to determine the existing condition total score.

Table 35*: Threshold - Organic Matter Depletion*

|  |  |
| --- | --- |
| **Soil Interpretation Rating** | **Threshold** |
| Soil barely capable of accumulating organic matter   (webservice rating = Organic Matter Depletion High) | 60 |
| Soil moderately capable of accumulating organic matter  (webservice ratings = Organic matter depletion moderately high AND Organic matter depletion moderate) | 50 |
| Soil highly capable of accumulating organic matter  (webservice ratings = Organic matter depletion moderately low AND Organic matter depletion low) | 40 |

**Irrigation Adjustment to Threshold:** If a planner indicates, in the Land Use Details that the PLU is irrigated, the threshold for Organic Matter Depletion is set to the next better capability soil interpretation rating class (i.e. threshold is lowered by 10 points) because irrigation use reduces moisture deficit in the soil thereby enhancing its capability to accumulate SOM.

When selected for evaluation, the existing condition question will be triggered as shown below for each land use. Points for existing conservation practices (historical and observed, functional) are added to the existing condition score to determine the existing condition total score.

**Crop**

Existing condition points are based on the combination of the soil’s inherent capability to maintain or accumulate SOM with the impact of the cropping management system in use.

Table 36*: Existing Condition - Organic Matter Depletion, Cropland*

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Existing Condition Points** | | |
| **Soil barely capable of accumulating SOM**  webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  webservice rating = Organic matter depletion moderately high AND Organic matter depletion moderate | **Soil highly capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low AND Organic matter depletion low |
| **None – Extensively Depleted Soil Organic Matter**  Answer yes to **2 or less** of the In-Field Soil Health Assessment indicators relating to this resource concern:   * Surface cover from plants, residue or mulch: cover greater than 75%. * Natural decomposition of crop residues is as expected with crop and conditions. * Granular soil structure in A horizon and no platy structure in A or B horizons. * Roots covered in a soil film (rhizosheaths) or are part of soil aggregates; or living roots, if present, are healthy, fully branched and extend into subsoil. * Clearly evident; more than 3 different types of organisms observed without magnification * Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. | 0 | 0 | 0 |
| **Low – Degraded Soil Organic Matter**  Answer yes to **3** of the In-Field Soil Health Assessment indicators relating to this resource concern:   * Surface cover from plants, residue or mulch: cover greater than 75% * Natural decomposition of crop residues is as expected with crop and conditions * Granular soil structure in A horizon and no platy structure in A or B horizons * Roots covered in a soil film (rhizosheaths) or are part of soil aggregates; or living roots, if present, are healthy, fully branched and extend into subsoil * Clearly evident; more than 3 different types of organisms observed without magnification * Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface | 0 | 1 | 6 |
| **Moderate – Reduced Levels of Soil Organic Matter**  Answer yes to **4** of the In-Field Soil Health Assessment indicators relating to this resource concern   * Surface cover from plants, residue or mulch: cover greater than 75%. * Natural decomposition of crop residues is as expected with crop and conditions. * Cylinder: At least 80% remains intact after 5 minutes with little cloudy water or strainer soil remains intact with aggregates apparent or soil quality test kit meets stability class 6. * Granular soil structure in A horizon and no platy structure in A or B horizons. * Roots covered in a soil film (rhizosheaths) or are part of soil aggregates; or living roots, if present, are healthy, fully branched and extend into subsoil. * Clearly evident; more than 3 different types of organisms observed without magnification. * Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. | 1 | 6 | 11 |
| **High – Soil Organic Matter is at or Exceeds Potential for the Site**  Answer yes to **5** or more of the In-Field Soil Health Assessment indicators relating to this resource concern:   * Surface cover from plants, residue or mulch: cover greater than 75%. * Natural decomposition of crop residues is as expected with crop and conditions. * Cylinder: At least 80% remains intact after 5 minutes with little cloudy water or strainer soil remains intact with aggregates apparent or soil quality test kit meets stability class 6. * Granular soil structure in A horizon and no platy structure in A or B horizons. * Roots covered in a soil film (rhizosheaths) or are part of soil aggregates; or living roots, if present, are healthy, fully branched and extend into subsoil. * Clearly evident; more than 3 different types of organisms observed without magnification. * Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. | 61 | 51 | 41 |

**Forest, Farmstead, Developed Land, Associated Agriculture Land, Other Rural Land**

Table 37*: Existing Condition - Organic Matter Depletion, Various Land Uses*

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Existing Condition Points** | | |
| **Soil barely capable of accumulating SOM**  webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  webservice rating = Organic matter depletion moderately high AND Organic matter depletion moderate | **Soil highly capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low AND Organic matter depletion low |
| **None – Extensively Depleted Soil Organic Matter**   * Living vegetation is absent or very sparse. * Plant litter, soil biological crust, and woody debris are absent or very sparse. * A planner may also determine if the use of assessment methods for Cropland, Range or Pasture are better suited to the site’s current conditions. | 0 | 0 | 0 |
| **Low – Degraded Soil Organic Matter**   * Living vegetation is predominantly annuals. A few perennials may be present. A soil biological crust has not formed. * Plant litter or woody debris is scattered leaving most of ground surface uncovered. No duff layer is present. * A planner may also determine if the use of assessment methods for Cropland, Range or Pasture are better suited to the site’s current conditions. | 0 | 1 | 6 |
| **Moderate – Reduced Levels of Soil Organic Matter**   * Living vegetation covers most of the ground surface. * Plant residue is mostly fragile. Woody debris is mostly fine. A thin duff layer may be present. A soil biological crust may be present on semi-arid and arid sites. * A planner may also determine if the use of assessment methods for Cropland, Range or Pasture are better suited to the site’s current conditions. | 1 | 6 | 11 |
| **High – Soil Organic Matter is at or Exceeds Potential for the Site**   * Ground is completely covered by a combination of living vegetation, fragile and non-fragile plant residue, or woody debris. A duff layer, or protective biological crust is present. * A planner may also determine if the use of assessment methods for Cropland, Range or Pasture are better suited to the site’s current conditions. | 61 | 51 | 41 |

**Range**

Table 38*: Existing Condition - Organic Matter Depletion, Range*

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Existing Condition Points** | | |
| **Soil barely capable of accumulating SOM**  webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  webservice rating = Organic matter depletion moderately high AND Organic matter depletion moderate | **Soil highly capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low AND Organic matter depletion low |
| **None – Extensively Depleted Soil Organic Matter**   * Interpreting Indicators of Rangeland Health – Soil Surface Loss and Degradation Indicator 9 departure is Extreme to Total | 0 | 0 | 0 |
| **Low – Degraded Soil Organic Matter**   * Interpreting Indicators of Rangeland Health – Either the Soil/Site Stability or the Biotic Integrity Attribute departure is from Moderate to Extreme, to Extreme to Total, and Soil Surface Loss and Degradation Indicator 9 departure is Moderate   OR   * Soil Surface Loss and Degradation Indicator 9 departure is Moderate to Extreme | 0 | 1 | 6 |
| **Moderate – Reduced Levels of Soil Organic Matter**   * Interpreting Indicators of Rangeland Health – Both the Soil/Site Stability and the Biotic Integrity Attribute departures are from Slight to Moderate, to Moderate, and Soil Surface Loss and Degradation Indicator 9 departure is Moderate   OR   * Soil Surface Loss and Degradation Indicator 9 departure is Slight to Moderate | 1 | 6 | 11 |
| **High – Soil Organic Matter is at or Exceeds Potential for the Site**   * Interpreting Indicators of Rangeland Health – Soil Surface Loss and Degradation Indicator 9 departure is None to Slight. | 61 | 51 | 41 |

**Pasture**

Table 39*: Existing Condition - Organic Matter Depletion, Pasture*

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Existing Condition Points** | | |
| **Soil barely capable of accumulating SOM**  webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  webservice rating = Organic matter depletion moderately high AND Organic matter depletion moderate | **Soil highly capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low AND Organic matter depletion low |
| **None – Extensively Depleted Soil Organic Matter**   * PCS Live or Dormant Plant Cover element score is 2 or lower.   AND   * Plant Residue and Litter as Soil Cover element score is 2 or lower.   AND   * Plant Diversity by Dry Weight element score is 2 or lower.   -OR-   * Determining Indicators of Pasture Health – Soil Surface Loss and Degradation Indicator 10 departure is Extreme to Total | 0 | 0 | 0 |
| **Low - Degraded Soil Organic Matter**   * PCS Live or Dormant Plant Cover element score is 3. * AND Plant Residue and Litter as Soil Cover element score is 3.   AND   * Plant Diversity by Dry Weight element score is 3.   -OR-   * Determining Indicators of Pasture Health – Either the Soil/Site Stability or the Biotic Integrity Attribute departure is from Moderate to Extreme, to Extreme to Total, and Soil Surface Loss and Degradation Indicator 10 departure is Moderate   OR   * Soil Surface Loss and Degradation Indicator 10 departure is Moderate to Extreme | 0 | 1 | 6 |
| **Moderate - Reduced Levels of Soil Organic Matter**   * PCS Live or Dormant Plant Cover element score is 4.   AND   * Plant Residue and Litter as Soil Cover element score is 4.   AND   * Plant Diversity by Dry Weight element score is 4.   -OR-   * Determining Indicators of Pasture Health – Both the Soil/Site Stability and the Biotic Integrity Attribute departures are from Slight to Moderate, to Moderate, and Soil Surface Loss and Degradation Indicator 10 departure is Moderate   OR   * Soil Surface Loss and Degradation Indicator 10 departure is Slight to Moderate. | 1 | 6 | 11 |
| **High – Soil Organic Matter is at or Exceeds Potential for the Site**   * PCS Live or Dormant Plant Cover element score is 5.   AND   * Plant Residue and Litter as Soil Cover element score is 5.   AND   * Plant Diversity by Dry Weight element score is 5.   -OR-   * Determining Indicators of Pasture Health – Soil Surface Loss and Degradation Indicator 10 departure is None to Slight. | 61 | 51 | 41 |

## **Concentration of Salts or Other Chemicals**

### Component: Concentration of salts or other chemicals

**Description:** Concentration of salts leading to salinity and/or sodicity reducing productivity or limiting desired use, or concentrations of other chemicals impacting productivity, populations of beneficial organisms, or limiting desired use.

**Objective:** Reduce concentration of salts or other chemicals in the soil.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

If the planner selects this resource concern component for assessment, a Soil Data Access (Agricultural Surface Salt Concentration Interpretation, (<https://jneme910.github.io/CART/chapters/Surface_Salt_Concentration>) webservice will be used to determine the percentage of soils susceptible to excess salinity or sodicity in the PLU. The Soil Data Access services utilizes the NRCS published soils database (SSURGO). The service request calculates the rolling sum values for rating acres and rating percent for each resource concern and finds the single most limiting rating (per land unit) that comprises **at least 10% by area or 10 acres, or 20% when less than 20 acres.** If saline or sodic soils are present, a threshold value will be set according to Table 40 and the existing condition question will be triggered. Existing condition points are set based on the user’s selection from Table 41. Points for existing conservation practices (historical and observed, functional) are added to the existing condition score to determine the existing condition total score.

Table 40*: Threshold - Concentration of Salts and Other Chemicals*

|  |  |
| --- | --- |
| **Soil Interpretation Rating** | **Threshold** |
| **High surface salinization risk or already saline** | 50 |
| **Surface salinization risk** | 30 |
| **Low surface salinization risk** | 1 |

Table 41*: Existing Condition - Concentration of Salts and Other Chemicals*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| **Excessive salt/chemical concentration in soil**   * Observation of mineral crust on the soil surface.   OR   * Soil or irrigation water test report indicates a salinity/sodicity impairment for desired plants. (Crop specific electrical conductivity (EC), pH, or sodium adsorption ratio (SAR) threshold values are exceeded.)   OR   * Observation of plant tissue salt injury symptoms including necrosis (burning) of leaf margins, stunted plants, wilting and in severe cases, plant death.   OR   * For range and pasture, salt concentrations are outside what is expected for the ecological site description. | 1 |
| **No excessive salt/chemical concentration in soil**   * No evidence of existing salinity/sodicity problem   OR   * Soil or irrigation water test report indicates salinity/sodicity is within suitable range for desired plants. (Crop specific electrical conductivity (EC), pH, or sodium adsorption ratio (SAR) threshold values are not exceeded.)   OR   * No plant tissue salt injury symptoms are apparent   OR   * For range and pasture, salt concentrations are match what is expected for the ecological site description | 51 |

## **Soil Organism Habitat Loss or Degradation**

### Component: Soil organism habitat loss or degradation

**Description:** Quantity, quality, diversity or connectivity of food, cover, space, shelter and/or water is inadequate to meet requirements of beneficial organisms

**Objective:** Improve habitat for beneficial soil organisms.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

If the planner selects this resource concern component for assessment, a Soil Data Access (Agricultural Organic Matter Depletion Interpretation, <https://jneme910.github.io/CART/chapters/Suitability_for_Aerobic_Soil_Organisms>) web service will be used to determine the percentage of soils suitable for aerobic soil organisms in the PLU. The Soil Data Access services utilizes the NRCS published soils database (SSURGO). The service request calculates the rolling sum values for rating acres and rating percent for each resource concern and finds the single most limiting rating (per land unit) that comprises **at least 10% by area or 10 acres, or 20% when less than 20 acres. The** Soil Organic Matter Depletion webservice is used to assess Soil Organism Habitat Loss or Degradation due to the importance of stable soil aggregates and soil organic matter to soil organism habitat.

The threshold is set based on the Table 42. The existing condition score will be set based on the answer a user selects, as shown in Table 43, Table 44, Table 46, and Table 45. Points for existing conservation practices (historical and observed, functional) are added to the existing condition score to determine the existing condition total score.

Table 42*: Threshold - Soil Organism Habitat Loss or Degradation*

|  |  |
| --- | --- |
| **Soil Interpretation Rating** | **Threshold** |
| Not favorable | 60 |
| Somewhat favorable | 50 |
| Very favorable | 40 |

**Irrigation Adjustment to Threshold:** If a planner indicates, in the Land Use Details that the PLU is irrigated, the threshold for Soil Organism Habitat Loss or Degradation is set to the next better capability soil interpretation rating class (i.e. threshold is lowered by 10 points) because irrigation use reduces moisture deficit in the soil thereby enhancing its capability to accumulate SOM.

**Crop**

Existing condition points are based on the combination of the soil’s inherent suitability for aerobic soil organism habitat with the cropping management system benefits for cover/residue/biomass of all crops and cover crops in the rotation combined with the effects of harvesting, grazing and tillage. Individual points for associated practices like crop rotation, cover crop and residue management are added to this system level credit.

Table 43*: Existing Condition - Soil Organism Habitat Loss or Degradation, Cropland*

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Existing Condition Points** | | |
| **Soil barely capable of accumulating SOM**  webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  webservice rating = Organic matter depletion moderately high AND Organic matter depletion moderate | **Soil highly capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low AND Organic matter depletion low |
| **None – Extensively Depleted Soil Organism Habitat**  Answer yes to **1 or less** of the In-Field Soil Health Assessment’s indicators relating to this resource concern:   * Surface cover from plants, residue or mulch: cover greater than 75%. * Natural decomposition of crop residues is as expected with crop and conditions. * Granular soil structure in A horizon and no platy structure in A or B horizons. * Roots covered in a soil film (rhizosheaths) or are part of soil aggregates; or living roots, if present, are healthy, fully branched and extend into subsoil. * Clearly evident; more than 3 different types of organisms observed without magnification * Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. | 0 | 0 | 0 |
| **Low – Depleted Soil Organism Habitat**  Answer yes to **2-3** of the In-Field Soil Health Assessment’s indicators relating to this resource concern:   * Surface cover from plants, residue or mulch: cover greater than 75% * Natural decomposition of crop residues is as expected with crop and conditions * Granular soil structure in A horizon and no platy structure in A or B horizons * Roots covered in a soil film (rhizosheaths) or are part of soil aggregates; or living roots, if present, are healthy, fully branched and extend into subsoil * Clearly evident; more than 3 different types of organisms observed without magnification * Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface | 0 | 1 | 6 |
| **Moderate – Diminished Soil Organism Habitat**  Answer yes to **3-4** of the In-Field Soil Health Assessment indicators relating to this resource concern.   * Surface cover from plants, residue or mulch: cover greater than 75%. * Natural decomposition of crop residues is as expected with crop and conditions. * Cylinder: At least 80% remains intact after 5 minutes with little cloudy water or strainer soil remains intact with aggregates apparent or soil quality test kit meets stability class 6. * Granular soil structure in A horizon and no platy structure in A or B horizons. * Roots covered in a soil film (rhizosheaths) or are part of soil aggregates; or living roots, if present, are healthy, fully branched and extend into subsoil. * Clearly evident; more than 3 different types of organisms observed without magnification. * Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. | 1 | 6 | 11 |
| **High – Soil Organism Habitat Extensive and contains all required components**  Answer yes to the In-Field Soil Health Assessment’s Water Stable Aggregates **and** 4 or more of the other indicators relating to this resource concern.   * Surface cover from plants, residue or mulch: cover greater than 75%. * Natural decomposition of crop residues is as expected with crop and conditions. * Cylinder: At least 80% remains intact after 5 minutes with little cloudy water or strainer soil remains intact with aggregates apparent or soil quality test kit meets stability class 6. * Granular soil structure in A horizon and no platy structure in A or B horizons. * Roots covered in a soil film (rhizosheaths) or are part of soil aggregates; or living roots, if present, are healthy, fully branched and extend into subsoil. * Clearly evident; more than 3 different types of organisms observed without magnification. * Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. | 61 | 51 | 41 |

**Associated Agriculture Land, Developed Land, Farmstead, Forest, Other Rural Land**

Table 44*: Existing Condition -* *Soil Organism Habitat Loss or Degradation, Various Land Uses*

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Existing Condition Points** | | |
| **Soil barely capable of accumulating SOM**  webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  webservice rating = Organic matter depletion moderately high AND Organic matter depletion moderate | **Soil highly capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low AND Organic matter depletion low |
| **None – Extensively Depleted Soil Organism Habitat**   * Living vegetation is absent or very sparse. * Plant litter, soil biological crust, and woody debris are absent or very sparse. * A planner may also determine if the use of assessment methods for Cropland, Range or Pasture are better suited to the site’s current conditions. | 0 | 0 | 0 |
| **Low –Degraded Soil Organism Habitat**   * Living vegetation is predominantly annuals. A few perennials may be present. A soil biological crust has not formed. * Plant litter or woody debris is scattered leaving most of ground surface uncovered. No duff layer is present. * A planner may also determine if the use of assessment methods for Cropland, Range or Pasture are better suited to the site’s current conditions. | 0 | 1 | 6 |
| **Moderate – Diminished Soil Organism Habitat**   * Living vegetation covers most of the ground surface. * Plant residue is mostly fragile. Woody debris is mostly fine. A thin duff layer may be present. A soil biological crust may be present on semi-arid and arid sites. * A planner may also determine if the use of assessment methods for Cropland, Range or Pasture are better suited to the site’s current conditions. | 1 | 6 | 11 |
| **High – Soil Organism Habitat Extensive and contains all required components**   * Ground is completely covered by a combination of living vegetation, fragile and non-fragile plant residue, or woody debris. A duff layer, or protective biological crust is present. * A planner may also determine if the use of assessment methods for Cropland, Range or Pasture are better suited to the site’s current conditions. | 61 | 51 | 41 |

**Pasture**

Table 45*: Existing Condition - Soil Organism Habitat Loss or Degradation, Pasture*

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Existing Condition Points** | | |
| **Soil barely capable of accumulating SOM**  webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  webservice rating = Organic matter depletion moderately high AND Organic matter depletion moderate | **Soil highly capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low AND Organic matter depletion low |
| **None – Extensively Depleted Soil Organism Habitat**   * PCS Live or Dormant Plant Cover element score is 2 or lower.   AND   * Plant Residue and Litter as Soil Cover element score is 2 or lower.   AND   * Plant Diversity by Dry Weight element score is 2 or lower.   -OR-   * Determining Indicators of Pasture Health – Soil/Site Stability, Hydrologic Function, and Biotic Integrity Attribute departures range from Moderate to Extreme, to Extreme to Total | 0 | 0 | 0 |
| **Low – Degraded Soil Organism Habitat**   * PCS Live or Dormant Plant Cover element score is 3.   AND   * Plant Residue and Litter as Soil Cover element score is 3.   AND   * Plant Diversity by Dry Weight element score is 3.   -OR-   * Determining Indicators of Pasture Health – At least two of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) are Moderate, to Moderate to Extreme departure, and one attribute is None to Slight, to Moderate departure   OR   * One of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) is Extreme to Total departure | 0 | 1 | 6 |
| **Moderate – Diminished Soil Organism Habitat**   * PCS Live or Dormant Plant Cover element score is 4.   AND   * Plant Residue and Litter as Soil Cover element score is 4.   AND   * Plant Diversity by Dry Weight element score is 4.   -OR-   * Determining Indicators of Pasture Health – Any one of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) is a Moderate, to Moderate to Extreme departure, and the other two Attributes are None to Slight, to Slight to Moderate departure   OR   * Two of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) are Slight to Moderate departure, and one of the three Attributes is a None to Slight departure | 1 | 6 | 11 |
| **High – Soil Organism Habitat Extensive and contains all required components**   * PCS Live or Dormant Plant Cover element score is 5.   AND   * Plant Residue and Litter as Soil Cover element score is 5.   AND   * Plant Diversity by Dry Weight element score is 5.   -OR-   * Determining Indicators of Pasture Health – All three of the Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) are None to Slight departure   OR   * Two of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) are None to Slight departure, and one of the three Attributes is Slight to Moderate departure | 61 | 51 | 41 |

**Range**

Table 46*: Existing Condition - Soil Organism Habitat Loss or Degradation, Range*

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Existing Condition Points** | | |
| **Soil barely capable of accumulating SOM**  webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  webservice rating = Organic matter depletion moderately high AND Organic matter depletion moderate | **Soil highly capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low AND Organic matter depletion low |
| **None – Extensively Depleted Soil Organism Habitat**   * Interpreting Indicators of Rangeland Health – Soil/Site Stability, Hydrologic Function, and Biotic Integrity Attribute departures range from Moderate to Extreme, to Extreme to Total | 0 | 0 | 0 |
| **Low – Degraded Soil Organism Habitat**   * Interpreting Indicators of Rangeland Health – At least two of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) are Moderate, to Moderate to Extreme departure, and one attribute is None to Slight, to Moderate departure   OR   * One of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) is Extreme to Total departure | 0 | 1 | 6 |
| **Moderate – Diminished Soil Organism Habitat**   * Interpreting Indicators of Rangeland Health – Any one of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) is a Moderate, to Moderate to Extreme departure, and the other two Attributes are None to Slight, to Slight to Moderate departure   OR   * Two of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) are Slight to Moderate departure, and one of the three Attributes is a None to Slight departure | 1 | 6 | 11 |
| **High – Soil Organism Habitat Extensive and contains all required components**   * Interpreting Indicators of Rangeland Health – All three of the Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) are None to Slight departure   OR   * Two of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) are None to Slight departure, and one of the three Attributes is Slight to Moderate departure | 61 | 51 | 41 |

## **Aggregate Instability**

### Component: Aggregate instability

**Description:** Management-induced degradation of water stable soil aggregates resulting in destabilized soil carbon; surface crusting; reduced water infiltration, reduced water holding capacity, reduced aeration; depressed resilience to extreme weather; increased ponding and flooding; increased soil erosion and plant stress; and reduced habitat and soil biological activity.

**Objective:** Improve aggregate stability.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

If the planner selects this resource concern component for assessment, a Soil Data Access (Agricultural Aggregate Instability Interpretation, (<https://jneme910.github.io/CART/chapters/Aggregate_stability>). web service will be used to determine the percentage of soils with potential to maintain stable soil aggregates in the PLU. The Soil Data Access services utilizes the NRCS published soils database (SSURGO). The service request calculates the rolling sum values for rating acres and rating percent for each resource concern and finds the single most limiting rating (per land unit) that comprises **at least 10% by area or 10 acres, or 20% if less than 20 acres.**

The threshold is set based on the Table 47. The existing condition score will be set based on the answer a user selects, as shown in Table 48, Table 49, Table 51, and Table 50. Points for existing conservation practices (historical and observed, functional) are added to the existing condition score to determine the existing condition total score.

Table 47*: Threshold - Aggregate Instability*

|  |  |
| --- | --- |
| **Soil Interpretation Rating** | **Threshold** |
| **Least aggregate stability**    (webservice rating = Low) | 60 |
| **Moderate aggregate stability**    (webservice rating = Moderate AND Moderate High) | 50 |
| **Most aggregate stability**    (webservice rating = High) | 40 |

**Irrigation Adjustment to Threshold:** If a planner indicates, in the Land Use Details that the PLU is irrigated, the threshold for Aggregate Instability is set to the next better capability soil interpretation rating class (i.e. threshold is lowered by 10 points) because irrigation use reduces moisture deficit in the soil thereby enhancing its capability to accumulate SOM.

**Crop**

Existing condition points are based on the combination of the soil’s inherent suitability for aerobic soil organism habitat with the cropping management system benefits for cover/residue/biomass of all crops and cover crops in the rotation combined with the effects of harvesting, grazing and tillage. Individual points for associated practices like crop rotation, cover crop and residue management are added to this system level credit. Soil Organic Matter Depletion assessment methods are used to assess Aggregate Instability due to the importance of soil organic matter for stable soil aggregates.

Table 48*: Existing Condition - Aggregate Instability, Cropland*

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Existing Condition Points** | | |
| **Soil barely capable of accumulating SOM**  webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  webservice rating = Organic matter depletion moderately high AND Organic matter depletion moderate | **Soil highly capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low AND Organic matter depletion low |
| **None – Soil Surface aggregation non-existent**  Answer **no** to all of the In-Field Soil Health Assessment indicators relating to this resource concern:   * Surface Crusting on no more than 5% of the field. * No ponding within 24 hrs. following typical rainfall or surface irrigation event. * Cylinder: At least 80% remains intact after 5 minutes with little cloudy water or strainer soil remains intact with aggregates apparent or soil quality test kit meets stability class 6. * Granular soil structure in A horizon and no platy structure in A or B horizons. * Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. | 0 | 0 | 0 |
| **Low – Aggregate Stability very weak**  Answer No to the In-Field Soil Health Assessment’s Water Stable Aggregates **and** **yes** to 1 -2 of the other indicators relating to this resource concern:   * Crusting on no more than 5% of the field. * No ponding within 24 hrs. following typical rainfall or surface irrigation event. * Cylinder: At least 80% remains intact after 5 minutes with little cloudy water or strainer soil remains intact with aggregates apparent or soil quality test kit meets stability class 6. * Granular soil structure in A horizon and no platy structure in A or B horizons. * Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. | 0 | 1 | 6 |
| **Moderate – Maintain Stable Aggregates under low to moderate stressors**  Answer **yes** to the In-Field Soil Health Assessment’s Water Stable Aggregates **and** **yes** to 2 of the other indicators relating to this resource concern:   * Crusting on no more than 5% of the field. * No ponding within 24 hrs. following typical rainfall or surface irrigation event. * Cylinder: At least 80% remains intact after 5 minutes with little cloudy water or strainer soil remains intact with aggregates apparent or soil quality test kit meets stability class 6. * Granular soil structure in A horizon and no platy structure in A or B horizons. * Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. | 1 | 6 | 11 |
| **High – Aggregate Stability very strong and at Potential for the Site**  Answer **yes** to the In-Field Soil Health Assessment’s Water Stable Aggregates **and** **yes** to 3 or more of the other indicators relating to this resource concern:   * Crusting on no more than 5% of the field. * No ponding within 24 hrs. following typical rainfall or surface irrigation event. * Cylinder: At least 80% remains intact after 5 minutes with little cloudy water or strainer soil remains intact with aggregates apparent or soil quality test kit meets stability class 6. * Granular soil structure in A horizon and no platy structure in A or B horizons. * Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. | 61 | 51 | 41 |

**Associated Agriculture Land, Developed Land, Farmstead, Forest, Other Rural Land**

Table 49*: Existing Condition - Aggregate Instability, Various Land Uses*

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Existing Condition Points** | | |
| **Soil barely capable of accumulating SOM**  webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  webservice rating = Organic matter depletion moderately high AND Organic matter depletion moderate | **Soil highly capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low AND Organic matter depletion low |
| **None – Soil Surface aggregation non-existent**   * Living vegetation is absent or very sparse. * Plant litter, soil biological crust, and woody debris are absent or very sparse. * A planner may also determine if the use of assessment methods for Cropland, Range or Pasture are better suited to the site’s current conditions. | 0 | 0 | 0 |
| **Low – Aggregate Stability very weak**   * Living vegetation is predominantly annuals. A few perennials may be present. A soil biological crust has not formed. * Plant litter or woody debris is scattered leaving most of ground surface uncovered. No duff layer is present. * A planner may also determine if the use of assessment methods for Cropland, Range or Pasture are better suited to the site’s current conditions. | 0 | 1 | 6 |
| **Moderate – Maintain Stable Aggregates under low to moderate stressors**   * Living vegetation covers most of the ground surface. * Plant residue is mostly fragile. Woody debris is mostly fine. A thin duff layer may be present. A soil biological crust may be present on semi-arid and arid sites. * A planner may also determine if the use of assessment methods for Cropland, Range or Pasture are better suited to the site’s current conditions. | 1 | 6 | 11 |
| **High – Aggregate Stability very strong and at Potential for the Site**   * Ground is completely covered by a combination of living vegetation, fragile and non-fragile plant residue, or woody debris. A duff layer, or protective biological crust is present. * A planner may also determine if the use of assessment methods for Cropland, Range or Pasture are better suited to the site’s current conditions. | 61 | 51 | 41 |

**Pasture**

Table 50: *Existing Condition – Aggregate Instability, Pasture*

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Existing Condition Points** | | |
| **Soil barely capable of accumulating SOM**  webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  webservice rating = Organic matter depletion moderately high AND Organic matter depletion moderate | **Soil highly capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low AND Organic matter depletion low |
| **None – Soil Surface aggregation non-existent**   * PCS Soil Condition and Regenerative Features score = 1   -OR-   * Determining Indicators of Pasture Health – Soil/Site Stability, Hydrologic Function, and Biotic Integrity Attribute departures range from Moderate to Extreme, to Extreme to Total | 0 | 0 | 0 |
| **Low – Aggregate Stability very weak**   * PCS Soil Condition and Regenerative Features score = 2.   -OR-   * Determining Indicators of Pasture Health – At least two of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) are Moderate, to Moderate to Extreme departure, and one attribute is None to Slight, to Moderate departure   OR   * One of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) is Extreme to Total departure | 0 | 1 | 6 |
| **Moderate – Maintaining Stable Aggregates under low to moderate stressors**   * PCS Soil Condition and Regenerative Features score = 3 or 4.   -OR-   * Determining Indicators of Pasture Health – Any one of the three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) is a Moderate, to Moderate to Extreme departure, and the other two Attributes are None to Slight, to Slight to Moderate departure   OR   * The three Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) are None to Slight, to Slight to Moderate departure | 1 | 6 | 11 |
| **High – Aggregate Stability very strong and at Potential for the Site**   * PCS Soil Condition and Regenerative Features score = 5.   -OR-   * Determining Indicators of Pasture Health – All three of the Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) are None to Slight departure | 61 | 51 | 41 |

**Range**

Table 51*: Existing Condition - Aggregate Instability, Range*

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Existing Condition Points** | | |
| **Soil barely capable of accumulating SOM**  webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  webservice rating = Organic matter depletion moderately high AND Organic matter depletion moderate | **Soil highly capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low AND Organic matter depletion low |
| **None – Soil Surface aggregation non-existent**   * Interpreting Indicators of Rangeland Health – Soil Surface Resistance to Erosion Indicator 8 departure is Extreme to Total | 0 | 0 | 0 |
| **Low – Aggregate Stability very weak**   * Interpreting Indicators of Rangeland Health – Either the Soil/Site Stability, the Hydrologic Function, or the Biotic Integrity Attribute departure is from Moderate to Extreme, to Extreme to Total, and Soil Surface Resistance to Erosion Indicator 8 departure is Moderate   OR   * Soil Surface Resistance to Erosion Indicator 8 departure is Moderate to Extreme | 0 | 1 | 6 |
| **Moderate – Maintain Stable Aggregates under low to moderate stressors**   * Interpreting Indicators of Rangeland Health – the Soil/Site Stability, Hydrologic Function, and the Biotic Integrity Attribute departures are from Slight to Moderate, to Moderate, and Soil Surface Resistance to Erosion Indicator 8 departure is Moderate   OR   * Soil Surface Resistance to Erosion Indicator 8 departure is Slight to Moderate | 1 | 6 | 11 |
| **High – Aggregate Stability very strong and at Potential for the Site**   * Interpreting Indicators of Rangeland Health – Soil Surface Resistance to Erosion Indicator 8 departure is None to Slight | 61 | 51 | 41 |

# **Water**

**Ponding and Flooding**

Component: Ponding and flooding

**Description:** Water covering the land surface, along with saturated conditions below the surface, degrades natural resources, or restricts capability of land to support its intended use.

**Objective:** Reduce the risk of natural resource degradation, or limitation to land use caused by flooding or ponding.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

A standard threshold of 50 will be used for Ponding and Flooding.

Upon selection of the component of Ponding and flooding for assessment, CART will run a web service (<https://jneme910.github.io/CART/chapters/Ponding_or_Flooding>) to determine the flood frequency and ponding frequency and inform the planner if the PLU has a rating of occasional, frequent or very frequent. The rating will be displayed within CART to assist the planner in making an informed existing condition selection.

The existing condition question will set the existing score as seen in Table 52.

Table 52*: Ponding and/or Flooding Existing Condition*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Occurs but does not negatively affect the intended use of the PLU | 51 |
| Occurs and negatively affects the intended use of the PLU | 1 |
| Does not occur on the PLU | 60 |

**Seasonal High Water Table**

Component: Seasonal high water table

**Description:** Groundwater or a perched water table causing saturated conditions near the surface degrades water resources or restricts capability of land to support its intended use.

**Objective:** Reduce the risk of natural resource degradation or limitation to land use caused by a seasonal high water table.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

A standard threshold of 50 will be used for Seasonal High Water Table.

Upon selection of the component of Seasonal high water table, CART will run a web service (<https://jneme910.github.io/CART/chapters/Depth_to_Water_Table>) to determine if the water table is within 18 inches of the surface. The result will be displayed within CART to assist the planner in making an informed existing condition selection.

If the planner previously selected the “drained” land use modifier for the assessed PLU, an additional question will be asked about the effectiveness of the existing drainage system in lowering the water table to meet client objectives.

The existing condition score will be set by the planner as seen in Table 53*:* .

Table 53*: Seasonal High Water Table Existing Condition*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Occurs but does not negatively affect the intended use of the PLU | 51 |
| Occurs and negatively affects the intended use of the PLU | 1 |
| Does not occur on the PLU | 60 |

**Seeps**

Component: Seeps

**Description:** Sub-surface saturated flows that percolate slowly to the surface, degrades water resources, or restrict capability of land to support its intended use.

**Objective:** Reduce the risk of natural resource degradation or limitation to land use caused by a seep.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

A standard threshold of 50 will be used for Seeps.

Upon selection of the component Seeps, CART will run a web service (<https://jneme910.github.io/CART/chapters/Hydric_Rating_by_Map_Unit>) to determine if soil map units in the PLU have a hydric rating of 1 or greater in Web Soil Survey and occurs on a representative slope gradient of 3% or more. The result will be displayed within CART to assist the planner in making an informed existing condition selection. The existing condition question will set the existing score as seen in

Table 54: Seeps Existing Condition

Note: Are treated and/or managed to meet the client’s natural resource management and land use objectives, avoids perpetuating existing natural resource concerns, and avoids creating new natural resource concerns..

Table 54*: Seeps Existing Condition*

Note: Are treated and/or managed to meet the client’s natural resource management and land use objectives, avoids perpetuating existing natural resource concerns, and avoids creating new natural resource concerns.

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Yes | 51 |
| No | 1 |
| Does not occur on PLU | 60 |

**Drifted Snow**

Component: Drifted snow

**Description:** Wind-blown snow accumulates around and over surface structures, which restricts access to humans and animals; or wind removes snow from desired locations where it can be used to accumulate water.

**Objective:** Control where snow drifts accumulate.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

A standard threshold of 50 will be used for Drifted snow. The planner will identify this resource concern based upon field conditions using the existing condition question and answers in Table 55.

Table 55*: Drifted Snow Existing Condition*

Note: Drifted snow typically is thought of as a negative affect when it accumulates in unwanted locations. Consider the beneficial effects of forcing snow to accumulate in strategic locations for such things as snow melt for season soil moisture or supplemental water for livestock.

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Causes damage to buildings or structures; interferes with livestock access to food, water, or shelter; interferes with access to essential agricultural operations; planner or client can document that retention or accumulation of snow in strategic locations is beneficial to the enterprise. | 1 |
| Does not cause damage to buildings or structures; interfere with livestock accessing food, water, or shelter; interfere with access to essential agricultural operations; planner or client can document that retention or accumulation of snow in strategic locations is not needed. | 51 |
| Does not occur on PLU | 60 |

**Surface Water Depletion**

Component: Surface water depletion

**Description:** Water from collected precipitation runoff, ponds, lakes, surface watercourses, and reservoirs is used at a rate that is detrimental to ecological functions or other identified uses and threatens sustained availability of surface water.

**Objective:** Reduce surface water depletion.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water**

Table 56 will be used to assess the existing condition through observation for all land uses. The threshold value for surface water depletion will be set at 50.

Table 56*: Surface Water Depletion Condition*

*Question hover text: Water from collected precipitation runoff, ponds, lakes, surface watercourses, and reservoirs is used at a rate that is detrimental to ecological functions or other identified uses and threatens sustained availability of surface water.*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| PLU activities do not deplete surface water | 60 |
| PLU activities are in keeping with available water supplies and/or meet state/local regulations | 51 |
| PLU activities contribute to depletions or do not meet state/local regulations, or are inconsistent with local/state water management plans or source water assessments/protection plans. | 1 |

**Groundwater Depletion**

Component: Groundwater depletion

**Description:** Underground water is used at a rate greater than aquifer recharge.

**Objective:** Reduce the risk of natural resource degradation, or limitation to land use caused by groundwater depletion

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

Table 57 will be used to assess the existing condition through observation for all land uses. The threshold value for Groundwater depletion will be 50.

Table 57*: Groundwater Depletion Condition*

*Question hover text: Underground water is used at a rate greater than aquifer recharge.*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| PLU activities do not deplete groundwater | 60 |
| PLU activities are commensurate with available water supplies and/or meet state/local regulations | 51 |
| PLU activities contribute to depletions or do not meet state/local regulations, or are inconsistent with local/state water management plans or source water assessments/protection plans. | 1 |

**Naturally Available Moisture Use**

Components: Moisture management and drought susceptibility

**Description:** Natural precipitation is not optimally managed to support desired land use goals or ecological processes.

**Objective:** Manage natural precipitation more efficiently.

**Analysis within CART:**

Table 58 will be used to assess the existing condition through observation for all land uses except for range and pasture.

The appropriate Pasture Condition Score and Interpreting Indicators of Rangeland Health questions will be used to assess the existing condition through observation on Range and Pasture. A threshold value for naturally available moisture use will be set at 50.

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land**

Table 58*: Naturally Available Moisture Is Being Managed to maintain or enhance water infiltration rates and minimize evaporation to utilize as much natural precipitation as possible.*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Yes | 51 |
| No | 1 |

**Pasture**

Table 59: *Pasture – Soil Compaction and Soil Regenerative Features*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| High | 30 | * Compaction: No dense or platy layers; crumbly soil throughout; * Roots: Abundant growth primarily downward through the soil profile; * Color: Surface horizon dramatically darker than subsoil; * Soil Life: Signs abundant throughout. * Pasture Condition Score element score = 5 |
| Good | 26 | * Compaction: Minor dense or platy layer; good aggregates common (crumbly soil): * Roots: Few horizontal, more downward through the soil profile; * Soil Life: Signs numerous throughout. * Pasture Condition Score element score = 4 |
| Fair | 17 | * Compaction: Thin dense or platy layer still present; * Roots: Some horizontal with increasing downward; * Color: Surface horizon moderately darker than subsoil; * Soil Life: Signs scattered throughout. * Pasture Condition Score element score = 3 |
| Low | 8 | * Compaction: Dense or moderate platy layer noticeable; * Roots: Numerous horizontal; moderate amount shallow/sparse; * Soil Life: Signs scattered in surface layer. * Pasture Condition Score element score = 2 |
| Poor | 1 | * Compaction: Dense or thick platy layer very distinct; * Roots: Dominantly horizontal; most shallow/sparse; * Color: Surface horizon same as subsoil; * Soil Life: Few or no signs * Pasture Condition Score element score = 1 |

Table 60*: Pasture –Plant Cover*

*Question hover text: Pasture Condition Score Live or Dormant Plant Cover or Determining Indicators of Pasture Health (DIPH)*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| High | 30 | * More than 95% live (non-dormant) leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 5 * OR * Determining Indicators of Pasture Health Hydrologic Function attributes are None to Slight Departure |
| Good | 26 | * 81-95% live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 4 * OR * Determining Indicators of Pasture Health Hydrologic Function attributes are Slight to Moderate Departure |
| Fair | 17 | * 66-80% live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 3 * OR * Determining Indicators of Pasture Health Hydrologic Function attributes are Moderate Departure |
| Low | 8 | * 40-65% is live leaf canopy Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 2 * OR * Determining Indicators of Pasture Health Hydrologic Function attributes are Moderate to Extreme Departure |
| Poor | 1 | * Less than 40% is live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 1 * OR * Determining Indicators of Pasture Health Hydrologic Function attributes are Extreme to Total Departure |

**Range**

Table 61: *Rangeland Health - Hydrologic Function*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| None to Slight | 50 | Interpreting Indicators of Rangeland Health (most current version) |
| Slight to Moderate | 40 | Interpreting Indicators of Rangeland Health (most current version) |
| Moderate | 25 | Interpreting Indicators of Rangeland Health (most current version) |
| Moderate to Extreme | 15 | Interpreting Indicators of Rangeland Health (most current version) |
| Extreme to Total | 1 | Interpreting Indicators of Rangeland Health (most current version) |

**Inefficient Irrigation Water Use**

Component: Inefficient irrigation water use

**Description:** Irrigation water is not stored, delivered, scheduled, and/or applied efficiently.

**Objective:** Manage irrigation water efficiently.

**Analysis within CART:**

**Associated Agriculture Land, Crop (Irrigated), Developed Land, Farmstead, Forest, Other Rural Land, Pasture (Irrigated), Range, Undetermined, Water**

Each PLU with “irrigated” assigned as a land use modifier will trigger the assessment with a threshold of 50 being set. The existing condition question will set the existing score as seen in Table 62*:* .

Table 62*: Irrigation System Condition*

*Question hover text: System includes point of diversion (on site or off site), delivery ditches, canals, or pipelines (on site or off site), and on field delivery and application.*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Irrigation water is being transported to, stored on, and applied to PLU in a manner that controls a known volume, frequency, and rate of application | 51 |
| Irrigation water is poorly managed or fails to meet critical crop growth needs even when water is available. | 40 |
| The irrigation delivery system is inadequate to control the rate of flow through the system and to the field, the conveyance system (ditches, canals, reservoirs) has obvious leaks or soils that are naturally erosive, susceptible to excessive seepage, or both (e.g., sandy and gravelly soils) | 30 |
| The on-field irrigation method is uncontrolled flood or improvements to on-field application system will benefit natural resources | 20 |

## **Nutrients Transported to Surface Water (field sediment, nutrient and pathogen loss)**

### Components: Nonpoint nitrogen surface loss and nonpoint phosphorus surface loss

**Description:** Applied nutrients are transported beyond the edge of the field and have the potential to contaminate surface waters in quantities that degrade water quality and limit its use.

**Objective:** Reduce nonpoint nutrient transport beyond the edge of the field to an average of less than the established threshold value by requiring a level of conservation management that is appropriate for each site’s potential for nonpoint nutrient runoff.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Water\***

**\***Water uses a standard 50 point threshold. It is added as a land use since improper cleaning of biofouling materials off of oyster racks could discharge nutrients into surface water.

Each PLU other than Water will have the PLU soil runoff potential determined. Each soil map unit within the PLU will be categorized into one of four soil runoff potential classes through the Water Quality Management Services - Soil Runoff, based on its published map unit components. This service utilizes the NRCS published soils database (SSURGO) according to the charts in Table 63, Table 64, and Table 65. Dual hydrologic group soils with an apparent water table in the rootzone will default their runoff rating to the drained phase if the PLU is drained and to the undrained phase if the PLU is not drained. The acre weighted average for the PLU is then determined based on ratings for each soil map unit in the PLU.

Table 63*: Soil Runoff Potential: Drained/No High Water Table*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Soil Runoff Potential | A | B | C | D |
| Low =0 | ALL | Slope < 4 | Slope < 2 | Slope < 2 AND kfactor < 0.28 |
| Moderate =1 | - | Slope >= 4 AND Slope <= 6 AND kfactor < 0.32 | Slope >= 2 AND slope <= 6 AND kfactor < 0.28 | Slope < 2 AND kfactor >= 0.28 |
| Moderately High =2 | - | Slope>= 4 AND slope <= 6 AND kfactor >= 0.32 | slope>= 2 AND slope <= 6 AND kfactor >= 0.28 | (slope>= 2 AND slope <= 4) |
| High =3 | - | Slope > 6 | Slope > 6 | Slope > 4 |

Table 64*: Soil Runoff Potential: If High Water Table Kind is Perched or Apparent and High Water Table is <= 61 cm AND Not Drained*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Soil Runoff Potential | A | B | C | D |
| Low =0 | - | - | - | - |
| Moderate =1 | - | - | - | - |
| Moderately High =2 | - | - | - | - |
| High =3 | All | All | All | All |

Table 65*:* *Soil Runoff Potential: Dual hydrologic soil groups A/D, BD, C/D that are not drained*

|  |  |  |  |
| --- | --- | --- | --- |
| Soil Runoff Potential | A/D | B/D | C/D |
| Low =0 | - | - | - |
| Moderate =1 | - | - | - |
| Moderately High =2 | - | - | - |
| High =3 | All | All | All |

**Irrigation Adjustment:**

Using the R factor from Water Quality R factor service modified by the amount of irrigation and the PLU soil runoff potential, determine the threshold of conservation management points necessary to meet the assessment threshold. **Note that Nutrients Transported to Surface Water has a nitrogen component and a phosphorus component that each have separate thresholds established as seen in** Table 66 **and** Table 67**.**

Table 66*: Determining Nonpoint Nitrogen Surface Loss Threshold*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Soil Vulnerability to Runoff | R Factor | | | |
| ≤50 | >50-150 | >150-250 | >250 |
| High | 25 | 55 | 70 | 90 |
| Moderately High | 25 | 40 | 40 | 45 |
| Moderate | 25 | 40 | 40 | 40 |
| Low | 25 | 30 | 30 | 30 |

Table 67*: Determining Nonpoint Phosphorus Surface Loss Threshold*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Soil Vulnerability to Runoff | R Factor | | | |
| ≤50 | >50-150 | >150-250 | >250 |
| High | 25 | 60 | 75 | 100 |
| Moderately High | 20 | 40 | 50 | 75 |
| Moderate | 20 | 25 | 25 | 30 |
| Low | 15 | 15 | 20 | 20 |

**Associated Agriculture Land,** **Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Water**

Table 68: *Nutrient Application – Nitrogen and Phosphorus Field Nutrient Loss (Water Quality Impacts)*

*Question hover text: Includes organic and inorganic nutrients applied mechanically or by hand. Does NOT include nutrients deposited by grazing animals when these are the only nutrients applied.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| No nutrients applied | 51 | No organic or inorganic nutrients are applied mechanically or by hand. Note that this does not include nutrients deposited by grazing animals when these are the only nutrients applied to the PLU. |
| Nutrients are applied | 0 | Organic or inorganic nutrients are applied to the PLU mechanically or by hand. |

**Crop**

Table 69*: Existing Condition - Cover/Residue/Biomass Crop Rotation Credit*

|  |  |  |
| --- | --- | --- |
| **Existing Condition - Crop Rotation Credits** Existing condition credits are based on system benefits for cover/residue/biomass of all crops and cover crops in the rotation combined with the effects of harvesting, grazing and tillage. ***Note that individual points for associated practices like crop rotation, cover crop and residue management are added in addition to this system level credit.***  Bulleted items are intended to be used as a guide to the current organic matter condition. Additional State guidance may be required. | **Nitrogen Runoff** | **Phosphorus Runoff** |
| **None – Rapidly Depleting Soil Organic Matter**   * Fallow (bare or chemical fallow) for significant portions of the management system * Crops with fragile residue * Multiple full-width tillage passes | 0 | 0 |
| **Low – Depleting Soil Organic Matter**   * A mix of crops with fragile and non-fragile residue * Partial width or limited full-width tillage | 2 | 5 |
| **Moderate – Maintaining Soil Organic Matter**   * Crop rotations with predominately non-fragile residue * May include cover crops * Part of the rotation in high residue crops * No full-width tillage or tillage passes minimize soil disturbance | 5 | 10 |
| **High – Building Soil Organic Matter**   * Crop rotations with high residue crops * Includes cover crops or perennial crops (including hay and green manures) with full ground cover * Not tilled or tilled infrequently during the rotation | 10 | 15 |

**Pasture**

Table 70: *Pasture – Erosion*

*Question hover text: Pasture Condition Score Sheet for Erosion*

|  |  |  |  |
| --- | --- | --- | --- |
| Answer | Nitrogen Runoff Existing Condition Points | Phosphorus Runoff Existing Condition Points | Reference for Existing Condition |
| High | 10 | 15 | * Sheet and Rill: Plant density high, no runoff, good infiltration. No evidence of present or past erosion. * Pasture Condition Score element score = 5 |
| Good | 5 | 10 | * Sheet and Rill: Plant density high, runoff low, good infiltration. May have evidence of past erosion if present. * Pasture Condition Score element score = 4 |
| Fair | 2 | 5 | * Sheet and Rill: Plant density good and runoff moderate. If present, erosion concentrated on heavily used areas. * Pasture Condition Score element score = 3 |
| Low | 1 | 2 | * Sheet and Rill: Plant density slows runoff. Erosion present and easily seen on steeper terrain. * Pasture Condition Score element score = 2 |
| Poor | 0 | 0 | * Sheet and Rill: Plant density is insufficient to stop runoff and poor infiltration. Erosion easily visible throughout pasture. * Pasture Condition Score element score = 1 |

## **Nutrients Transported to Groundwater (field loss)**

### Components: Nonpoint nitrogen leaching loss and nonpoint phosphorus leaching loss

**Description:** Applied nutrients are transported below the rootzone and have the potential to contaminate groundwater in quantities that could degrade water quality and limit its use.

**Objective:** Reduce nonpoint nutrient transport below the rootzone to groundwater by requiring a level of management that is appropriate for each site’s potential for nonpoint nutrient leaching.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture**

Each PLU will have the PLU soil leaching potential determined. Each soil map unit within the PLU will be categorized into one of four soil leaching potentials through the Water Quality Management Services - Soil Leaching, based on published map unit components. The service utilizes the NRCS-published soils database (SSURGO) for mineral soils with no high water table according to the chart in Table 71. Dual hydrologic group soils with an apparent water table in the rootzone will default their leaching rating to High whether the PLU is drained or undrained. The acre weighted average rating for the PLU is then determined based on ratings for each soil map unit in the PLU.

Table 71*: Soil Leaching Potential*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Nutrient Leaching Potential (NLP) | A | B | C | D |
| Low =0 | - | - | - | ALL |
| Moderate =1 | - | (Slope <= 12 AND kfact >= 0.24) OR slope > 12 | ALL | - |
| Moderately High =2 | Slope > 12 | Slope >= 3 AND slope <= 12 AND kfact < 0.24 | - | - |
| High =3 | Slope <=12 | Slope < 3 AND kfactor < 0.24 |  |  |

**Exceptions:**

High:

* Dual hydrologic soil group (A/D, B/D, C/D)
* Water table kind = “Apparent" AND High Water Table <= 76 cm)
* Taxonomic order = Histosols

**Note: Drainage has no effect on leaching potential.**

**Coarse Fragment correction:**

If coarse fragment volume > 30 then + 2 to NSLP (Note: final maximum NSLP is 3)

If coarse fragment volume > 10 AND <= 30 then + 1 to NSLP (Note: final maximum NSLP is 3)

**Irrigation Adjustment:**

Using the R factor from Water Quality R factor service modified by the amount of irrigation and the PLU soil leaching potential, determine the threshold of conservation management points necessary to meet the assessment threshold. **Note that Nutrients Transported to Groundwater has a nitrogen component and a phosphorus component that each have separate thresholds established as seen in** Table 72 **and** Table 73**.**

Table 72*: Determining Nonpoint Nitrogen Leaching Loss Threshold*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Leaching Vulnerability | R Factor | | | |
| ≤50 | >50-150 | >150-250 | >250 |
| High | 25 | 45 | 45 | 50 |
| Moderately High | 25 | 35 | 40 | 45 |
| Moderate | 25 | 30 | 35 | 45 |
| Low | 25 | 30 | 30 | 45 |

Table 73*: Determining Nonpoint Phosphorus Leaching Loss Threshold*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Leaching Vulnerability | R Factor | | | |
| ≤50 | >50-150 | >150-250 | >250 |
| High | 15 | 20 | 35 | 55 |
| Moderately High | 10 | 15 | 35 | 55 |
| Moderate | 10 | 15 | 30 | 55 |
| Low | 10 | 10 | 20 | 45 |

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture**

Table 74*: Nutrient Application – Nitrogen and Phosphorus Field Nutrient Loss (Water Quality Impacts)*

*Question hover text: Includes organic and inorganic nutrients applied mechanically or by hand. Does NOT include nutrients deposited by grazing animals when these are the only nutrients applied.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| No nutrients applied | 51 | No organic or inorganic nutrients are applied mechanically or by hand. Note that this does not include nutrients deposited by grazing animals when these are the only nutrients applied to the PLU. |
| Nutrients are applied | 0 | Organic or inorganic nutrients are applied to the PLU mechanically or by hand. |

**Crop**

Table 75*: Existing Condition - Cover/Residue/Biomass Crop Rotation Credit*

|  |  |  |
| --- | --- | --- |
| **Existing Condition - Crop Rotation Credits** Existing condition credits are based on system benefits for cover/residue/biomass of all crops and cover crops in the rotation combined with the effects of harvesting, grazing and tillage. ***Note that individual points for associated practices like crop rotation, cover crop and residue management are added in addition to this system level credit.***  Bulleted items are intended to be used as a guide to the current organic matter condition. Additional State guidance may be required. | **Nitrogen Leaching** | **Phosphorus Leaching** |
| **None – Rapidly Depleting Soil Organic Matter**   * Fallow (bare or chemical fallow) for significant portions of the management system * Crops with fragile residue * Multiple full-width tillage passes | 0 | 0 |
| **Low – Depleting Soil Organic Matter**   * A mix of crops with fragile and non-fragile residue * Partial width or limited full-width tillage | 2 | 2 |
| **Moderate – Maintaining Soil Organic Matter**   * Crop rotations with predominately non-fragile residue * May include cover crops * Part of the rotation in high residue crops * No full-width tillage or tillage passes minimize soil disturbance | 5 | 5 |
| **High – Building Soil Organic Matter**   * Crop rotations with high residue crops * Includes cover crops or perennial crops (including hay and green manures) with full ground cover * Not tilled or tilled infrequently during the rotation | 10 | 10 |

**Pasture**

Table 76: *Pasture – Erosion*

*Question hover text: Pasture Condition Score Sheet*

|  |  |  |  |
| --- | --- | --- | --- |
| Answer | Nitrogen Leaching Loss Existing Condition Points | Phosphorus Leaching Loss Existing Condition Points | Reference for Existing Condition |
| High | 10 | 10 | * Sheet and Rill: Plant density high, no runoff, good infiltration. No evidence of present or past erosion. * Pasture Condition Score element score = 5 |
| Good | 5 | 5 | * Sheet and Rill: Plant density high, runoff low, good infiltration. May have evidence of past erosion if present. * Pasture Condition Score element score = 4 |
| Fair | 2 | 2 | * Sheet and Rill: Plant density good and runoff moderate. If present, erosion concentrated on heavily used areas. * Pasture Condition Score element score = 3 |
| Low | 1 | 1 | * Sheet and Rill: Plant density slows runoff. Erosion present and easily seen on steeper terrain. * Pasture Condition Score element score = 2 |
| Poor | 0 | 0 | * Sheet and Rill: Plant density is insufficient to stop runoff and poor infiltration. Erosion easily visible throughout pasture. * Pasture Condition Score element score = 1 |

## **Nutrients Transported to Surface Water (storage and handling of pollutants)**

### Component 1: Concentrated nutrient and pathogen effluent from domestic animal confinement, including milkhouse waste and silage leachate

**Description:** Concentrated nutrients and pathogen effluent from domestic animal confinement (including barnyard runoff, milkhouse waste and silage leachate) impact surface waters in sufficient quantities that degrade water quality and may limit its use.

**Objective:** Reduce concentrated losses of nutrients and pathogen from domestic animal confinement by requiring appropriate management wherever concentrated sources of contaminants are identified by the planner.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

The planner will identify the applicable resource concern based on site-specific conditions. A standard threshold of 50 points will be set.

Table 77*: Concentrated nutrient and pathogen effluent discharged or stored on the PLU*

Note: (Both agricultural including milkhouse waste, feedstocks such as grains, silage, etc. and non-agricultural such as food waste)

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable - Nutrient and pathogen effluents are **NOT discharged or** **stored** on the PLU. | 60 |
| Nutrient and pathogen effluents **ARE discharged or stored** on the PLU and adequate control/treatment is **NOT** in place. | 0 |
| Nutrient and pathogen effluents **ARE discharged or stored** on the PLU and adequate control/treatment IS in place. | 51 |

### Component 2: Concentrated nutrient and pathogen surface loss from domestic animals standing in surface water

**Description:** Concentrated nutrients and pathogens are lost when domestic animals have direct access to surface waters in sufficient quantities that degrade water quality and limits its use.

**Objective:** Reduce concentrated losses of nutrients and pathogen from direct domestic animal access to surface water by requiring appropriate management wherever concentrated sources of contaminants are identified by the planner.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

The planner will identify the applicable resource concern based on site-specific conditions. A standard threshold of 50 points will be set.

Table 78*: Animal Access to Surface Water Bodies*

*Question hover text: Do animals have direct access to surface water bodies?*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable - Animals do **NOT** have direct access to surface water bodies | 60 |
| Animals have UNCONTROLLED access to surface water bodies | 0 |
| Animals have effective CONTROLLED access to surface water bodies | 51 |

### Component 3: Concentrated nutrient and pathogen surface loss from storage and handling of manure, compost, biosolids, or non-ag food waste

**Description:** Manures, biosolids, compost, non-ag food wastes or other soil amendment and pathogen sources are present on the PLU, so they have the potential to contaminate surface waters. The planner will identify this resource concern based on site-specific conditions.

**Objective:** Control accidental release of manures, biosolids, compost, or other nutrient and pathogen sources products to prevent contamination of surface waters.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

The planner will identify this resource concern based on site-specific conditions. A planning threshold value of 50 will be set and the three existing condition questions will be triggered. The existing condition questions (Yes/No) will set the existing score as seen in Table 79.

Table 79*: Manures, Biosolids, Compost, or Other Soil Amendment and Pathogen Sources Stockpiled or Stored on PLU*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 60 |
| Only solid material storage - contained | 51 |
| Only solid material storage - not contained | 1 |
| Liquid or mixed manure storage - contained | 51 |
| Liquid or mixed manure storage – contained, aerobic or covered | 51 |
| Liquid or mixed manure storage - not contained | 1 |

## **Nutrients Transported to Groundwater (storage and handling of pollutants)**

### Component 1: Concentrated nutrient and pathogen leaching loss from domestic animal confinement, including milkhouse waste and silage leachate

**Description:** Concentrated nutrients and pathogen effluent from domestic animal confinement (including milkhouse waste and silage leachate) impact groundwater in sufficient quantities that degrade water quality and may limit its use.

**Objective:** Reduce concentrated losses of nutrients and pathogen from domestic animal confinement by requiring appropriate management wherever concentrated sources of contaminants are identified by the planner.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

The planner will identify the applicable resource concern based on site-specific conditions. A standard threshold of 50 points will be set.

Table 80*: Concentrated nutrient and pathogen effluent discharged or stored on the PLU*

Note: (both agricultural including milkhouse waste, feedstocks such as grains, silage, etc. and non-agricultural such as food waste)

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable - Nutrient and pathogen effluents are **NOT discharged or** **stored** on the PLU. | 60 |
| Nutrient and pathogen effluents **ARE discharged or stored** on the PLU and adequate control/treatment is **NOT** in place. | 0 |
| Nutrient and pathogen effluents **ARE stored** on the PLU and adequate control/treatment IS in place. | 51 |

### Component 2: Concentrated nutrient and pathogen leaching loss from storage and handling of manure, compost, biosolids, and non-ag food waste

**Description:** Manures, biosolids, compost, non-ag food wastes or other soil amendment and pathogen sources are present on the PLU, so they have the potential to contaminate groundwater. The planner will identify this resource concern based on site-specific conditions.

**Objective:** Control accidental release of manures, biosolids, compost, or other nutrient and pathogen sources products to prevent contamination of groundwater.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

The planner will identify this resource concern based on site-specific conditions. A standard threshold value of 50 will be set. The existing condition questions will set the existing score as seen in Table 81 below.

Table 81*: Manures, Biosolids, Compost, or Other Soil Amendment and Pathogen Sources Stockpiled or Stored on the PLU*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 60 |
| Only solid material storage - contained | 51 |
| Only solid material storage - not contained | 1 |
| Liquid or mixed manure storage - contained | 51 |
| Liquid or mixed manure storage – contained, aerobic or covered | 51 |
| Liquid or mixed manure storage - not contained | 1 |

## **Pesticides Transported to Surface Water**

### Component 1: Nonpoint pesticide surface loss

**Description:** Applied pesticides move offsite in runoff or drift and have the potential to be transported to surface water sources in quantities that degrade water quality and limit its use.

**Objective:** Reduce hazardous nonpoint pesticide losses in surface runoff or drift that can be transported to surface water sources.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water**

Each PLU will have the PLU soil runoff potential determined. Each soil map unit within the PLU will be categorized into one of four soil runoff potentials through the Water Quality Management Services - Soil Runoff, based on its published map unit components. This service utilizes the NRCS-published soils database (SSURGO) according to the charts in Table 82, Table 83, and Table 84. The acre weighted average rating for the PLU is then determined based on ratings for each soil map unit in the PLU. Note that for CART analysis these runoff ratings do not split out solution runoff and adsorbed runoff the way the Windows Pesticide Screening Tool (WIN-PST) does to support the application of the Integrated Pest Management Conservation Practice (Code 595).

Table 82*: Soil Runoff Potential: Drained/No High Water Table*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Soil Runoff Potential | A | B | C | D |
| Low =0 | ALL | Slope < 4 | Slope < 2 | Slope < 2 AND kfactor < 0.28 |
| Moderate =1 | - | Slope >= 4 AND Slope <= 6 AND kfactor < 0.32 | Slope >= 2 AND slope <= 6 AND kfactor < 0.28 | Slope < 2 AND kfactor >= 0.28 |
| Moderately High =2 | - | Slope>= 4 AND slope <= 6 AND kfactor >= 0.32 | slope>= 2 AND slope <= 6 AND kfactor >= 0.28 | (slope>= 2 AND slope <= 4) |
| High =3 | - | Slope > 6 | Slope > 6 | Slope > 4 |

Table 83*: Soil Runoff Potential: If High Water Table Kind is Perched or Apparent and High Water Table is <= 61 cm AND Not Drained*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Soil Runoff Potential | A | B | C | D |
| Low =0 | - | - | - | - |
| Moderate =1 | - | - | - | - |
| Moderately High =2 | - | - | - | - |
| High =3 | All | All | All | All |

Table 84*:* *Soil Runoff Potential: Dual hydrologic soil groups A/D, BD, C/D that are not drained*

|  |  |  |  |
| --- | --- | --- | --- |
| Soil Runoff Potential | A/D | B/D | C/D |
| Low =0 | - | - | - |
| Moderate =1 | - | - | - |
| Moderately High =2 | - | - | - |
| High =3 | All | All | All |

Each PLU will have the PLU R factor class determined by the R Factor Service. If the service is not available, the user will manually answer the question in CART. The R factor class result will be matrixed with the acre weighted average soil rating for the PLU in Table 85.

Table 85*: Determining Nonpoint Pesticide Surface Loss Threshold*

|  |  |  |
| --- | --- | --- |
| Soil Vulnerability to Runoff | R Factor | |
| Dry Climate:  ≤50 R Factor | Humid Climate: >50 R Factor |
| High | 30 | 60 |
| Moderately High | 30 | 60 |
| Moderate | 30 | 60 |
| Low | 15 | 30 |

Pesticide risk existing condition credit will come from the worst-case selection for the PLU.

**Crop**

For cropland the highest risk crop in the rotation should be selected for the Crop Group to inform the Pesticide Use and Risk category choice, and “High” should be the default when Pesticide Use and Risk is unknown.

Table 86*: Cropping Risk Categories for Pesticide Loss*

|  |  |  |  |
| --- | --- | --- | --- |
| Answer | Pesticide Use and Risk | Existing Condition Score Dry Climate | Existing Condition Score Humid Climate |
| 1. Unknown | High | 1 | 1 |
| 2. Orchards, vineyards, berries and nut crops | High | 1 | 1 |
| 3. Vegetable Crops | High | 1 | 1 |
| 4. Cotton | High | 1 | 1 |
| 5. Seed crops | High | 1 | 1 |
| 6. Flooded rice and cranberry crops | High | 1 | 1 |
| 7. Turfgrass for sod and nursery crops | High | 1 | 1 |
| 8. Close grown crops - residue not harvested | Moderate | 10 | 20 |
| 9. Close grown crops – residue removed | Moderate | 10 | 20 |
| 10. Row crops – durable residue not harvested | Moderate | 10 | 20 |
| 11. Row crops - residue removed or fragile | Moderate | 10 | 20 |
| 12. Christmas trees | Moderate | 10 | 20 |
| 13. Hay crops - forage | Low | 15 | 30 |

Table 87*: Existing Condition - Cover/Residue/Biomass Crop Rotation Credit*

|  |  |
| --- | --- |
| **Existing Condition - Crop Rotation Credits** Existing condition credits are based on system benefits for cover/residue/biomass of all crops and cover crops in the rotation combined with the effects of harvesting, grazing and tillage.  ***Note that individual points for associated practices like crop rotation, cover crop and residue management are added in addition to this system level credit.***  Bulleted items are intended to be used as a guide to the current organic matter condition. Additional State guidance may be required. | **Pesticide Runoff** |
| **None – Rapidly Depleting Soil Organic Matter**   * Fallow (bare or chemical fallow) for significant portions of the management system * Crops with fragile residue * Multiple full-width tillage passes | 0 |
| **Low – Depleting Soil Organic Matter**   * A mix of crops with fragile and non-fragile residue * Partial width or limited full-width tillage | 10 |
| **Moderate – Maintaining Soil Organic Matter**   * Crop rotations with predominately non-fragile residue * May include cover crops * Part of the rotation in high residue crops * No full-width tillage or tillage passes minimize soil disturbance | 20 |
| **High – Building Soil Organic Matter**   * Crop rotations with high residue crops * Includes cover crops or perennial crops (including hay and green manures) with full ground cover * Not tilled or tilled infrequently during the rotation | 30 |

**Non-Cropland: Associated Agriculture Land, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water**

Table 88*:*  *Pesticide Use and Risk Category (non-Cropland)*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Score  Dry Climate | Existing Condition Score  Humid Climate |
| Low | 15 | 30 |
| None | 30 | 60 |

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water**

Table 89*:* *Integrated Pest Management – IPM System for Field Pesticide Loss Water Quality Impacts*

Note: What kind of Integrated Pest Management (IPM) System is implemented on the PLU to manage pests and pesticide environmental risk?

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Pest Management Conservation System (Code 595) - Full IPM System for Efficient Production and Environmental Protection | 51 | A full IPM System is utilized including Prevention, Avoidance, Monitoring, and Suppression to manage pests (including invasive plants) to meet production needs and manage pesticide environmental risk. If this answer is selected, do NOT select Practice code 595 on the Existing or Planned Practices pages so as not to double count points. |
| Full IPM System for Efficient Production | 25 | A full IPM System is utilized including Prevention, Avoidance, Monitoring, and Suppression to manage pests (including invasive plants) to meet production needs. |
| No IPM System, but pesticides are used to manage pests. | 1 | An IPM System is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs. |
| No IPM System, but pesticides are used to manage pests and spray drift is minimized. | 1 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs, and pesticide drift is minimized with drift reducing spray technologies. |
| No IPM System, but pesticides are used to manage pests and the development of pest resistance is carefully managed. | 1 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to address production needs and the development of pest resistance is carefully managed. |
| No IPM System, but pesticides are used to manage pests, the development of pest resistance is carefully managed, and spray drift is minimized. | 1 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to address production needs, the development of pest resistance is carefully managed, and pesticide drift is minimized with drift reducing spray technologies. |
| No pesticides are used to manage pests. | 51 | Pests (including invasive plants) are managed to meet production needs without the use of pesticides. |
| No pesticides are used because pests are not managed. | 51 | Pests (including Invasive plants) are not managed (no pesticides are used) so production may be reduced beyond tolerable limits. |

### Component 2: Nonpoint pesticide drift to surface water

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water**

The planner will identify this resource concern based on site-specific conditions including proximity to a surface water body. Where identified, at least 50 points of pesticide drift mitigation will be required from appropriate conservation practices and activities, such as a Pest Management Conservation System.

**Crop**

For cropland the highest risk crop in the rotation should be used to inform the Pesticide Use and Risk category choice and “High” is the default when Pesticide Use and Risk is unknown.

Table 90*: Cropping Risk Categories for Pesticide Loss*

|  |  |  |  |
| --- | --- | --- | --- |
| Answer | Pesticide Use and Risk | Existing Condition Score Dry Climate | Existing Condition Score Humid Climate |
| 1. Unknown | High | 1 | 1 |
| 2. Orchards, vineyards, berries and nut crops | High | 1 | 1 |
| 3. Vegetable Crops | High | 1 | 1 |
| 4. Cotton | High | 1 | 1 |
| 5. Seed crops | High | 1 | 1 |
| 6. Flooded rice and cranberry crops | High | 1 | 1 |
| 7. Turfgrass for sod and nursery crops | High | 1 | 1 |
| 8. Close grown crops - residue not harvested | Moderate | 10 | 20 |
| 9. Close grown crops – residue removed | Moderate | 10 | 20 |
| 10. Row crops – durable residue not harvested | Moderate | 10 | 20 |
| 11. Row crops - residue removed or fragile | Moderate | 10 | 20 |
| 12. Christmas trees | Moderate | 10 | 20 |
| 13. Hay crops - forage | Low | 15 | 30 |

**Non-Cropland: Associated Agriculture Land, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water**

Table 91*:*  *Pesticide Use and Risk Category (non-Cropland)*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Score  Dry Climate | Existing Condition Score  Humid Climate |
| Low | 15 | 30 |
| None | 30 | 60 |

**Non-Cropland: Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water**

Table 92*: Integrated Pest Management – IPM System for Field Pesticide Loss Water Quality Impacts*

Note: What kind of Integrated Pest Management (IPM) System is implemented on the PLU to manage pests and pesticide environmental risk?

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Pest Management Conservation System (Code 595) - Full IPM System for Efficient Production and Environmental Protection | 51 | A full IPM System is utilized including Prevention, Avoidance, Monitoring, and Suppression to manage pests (including invasive plants) to meet production needs and manage pesticide environmental risk. If this answer is selected, do NOT select Practice code 595 on the Existing or Planned Practices pages so as not to double count points. |
| Full IPM System for Efficient Production | 51 | A full IPM System is utilized including Prevention, Avoidance, Monitoring, and Suppression to manage pests (including invasive plants) to meet production needs. |
| No IPM System, but pesticides are used to manage pests. | 1 | An IPM System is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs. |
| No IPM System, but pesticides are used to manage pests and spray drift is minimized. | 51 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs, and pesticide drift is minimized with drift reducing spray technologies. |
| No IPM System, but pesticides are used to manage pests and the development of pest resistance is carefully managed. | 1 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to address production needs and the development of pest resistance is carefully managed. |
| No IPM System, but pesticides are used to manage pests, the development of pest resistance is carefully managed, and spray drift is minimized. | 51 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to address production needs, the development of pest resistance is carefully managed, and pesticide drift is minimized with drift reducing spray technologies. |
| No pesticides are used to manage pests. | 51 | Pests (including invasive plants) are managed to meet production needs without the use of pesticides. |
| No pesticides are used because pests are not managed. | 51 | Pests (including Invasive plants) are not managed (no pesticides are used) so production may be reduced beyond tolerable limits. |

## **Pesticides Transported to Groundwater**

### Component: Nonpoint pesticide leaching loss

**Description:** Applied pesticides move below the rootzone and have the potential to be transported to groundwater sources in quantities that degrade water quality and limit its use.

**Objective:** Reduce hazardous nonpoint pesticide losses that can be transported to groundwater sources.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water**

Each PLU will have the PLU soil leaching potential determined. Each soil map unit component within the PLU will be categorized into one of four WIN-PST soil leaching potentials through the Water Quality Management Services – WIN-PST Soil Leaching. This service utilizes the NRCS-published soils database (SSURGO) data according to published WIN-PST criteria. Note that soils with a dual hydrologic group due to an apparent water table in the rootzone are rated as “High”. The acre weighted average rating for the PLU is then determined based on ratings for each soil map unit in the PLU.

Users will select a Pesticide Use and Risk category. For cropland the highest risk crop in the rotation should be selected for Crop Group to inform the Pesticide Use and Risk category choice, and “High” should be the default when Pesticide Use and Risk is unknown.

Table 93*: Determining Nonpoint Pesticide Leaching Loss Threshold*

|  |  |  |
| --- | --- | --- |
| Soil Vulnerability to Leaching | R Factor | |
| Dry Climate:  ≤50 R Factor | Humid Climate: >50 R Factor |
| High | 30 | 60 |
| Moderately High | 30 | 60 |
| Moderate | 30 | 60 |
| Low | 15 | 30 |

Pesticide risk existing condition credit will come from the worst-case selection for the PLU.

**Crop**

For cropland the highest risk crop in the rotation should be selected for the Crop Group to inform the Pesticide Use and Risk category choice, and “High” should be the default when Pesticide Use and Risk is unknown.

Table 94*: Cropping Risk Categories for Pesticide Loss*

|  |  |  |  |
| --- | --- | --- | --- |
| Answer | Pesticide Use and Risk | Existing Condition Score Dry Climate | Existing Condition Score Humid Climate |
| 1. Unknown | High | 1 | 1 |
| 2. Orchards, vineyards, berries and nut crops | High | 1 | 1 |
| 3. Vegetable Crops | High | 1 | 1 |
| 4. Cotton | High | 1 | 1 |
| 5. Seed crops | High | 1 | 1 |
| 6. Flooded rice and cranberry crops | High | 1 | 1 |
| 7. Turfgrass for sod and nursery crops | High | 1 | 1 |
| 8. Close grown crops - residue not harvested | Moderate | 10 | 20 |
| 9. Close grown crops – residue removed | Moderate | 10 | 20 |
| 10. Row crops – durable residue not harvested | Moderate | 10 | 20 |
| 11. Row crops - residue removed or fragile | Moderate | 10 | 20 |
| 12. Christmas trees | Moderate | 10 | 20 |
| 13. Hay crops - forage | Low | 15 | 30 |

Table 95*: Existing Condition - Cover/Residue/Biomass Crop Rotation Credit*

|  |  |
| --- | --- |
| **Existing Condition - Crop Rotation Credits** Existing condition credits are based on system benefits for cover/residue/biomass of all crops and cover crops in the rotation combined with the effects of harvesting, grazing and tillage. ***Note that individual points for associated practices like crop rotation, cover crop and residue management are added in addition to this system level credit.***  Bulleted items are intended to be used as a guide to the current organic matter condition. Additional State guidance may be required. | **Pesticide Leaching** |
| **None – Rapidly Depleting Soil Organic Matter**   * Fallow (bare or chemical fallow) for significant portions of the management system * Crops with fragile residue * Multiple full-width tillage passes | 0 |
| **Low – Depleting Soil Organic Matter**   * A mix of crops with fragile and non-fragile residue * Partial width or limited full-width tillage | 5 |
| **Moderate – Maintaining Soil Organic Matter**   * Crop rotations with predominately non-fragile residue * May include cover crops * Part of the rotation in high residue crops * No full-width tillage or tillage passes minimize soil disturbance | 10 |
| **High – Building Soil Organic Matter**   * Crop rotations with high residue crops * Includes cover crops or perennial crops (including hay and green manures) with full ground cover * Not tilled or tilled infrequently during the rotation | 15 |

**Non-Cropland: Associated Agriculture Land, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water**

For all land uses other than cropland, the user will select the Pesticide Use and Risk category of “low” or “none” and the existing condition credit will be conditional on the Climate R Factor.

Table 96*:*  *Pesticide Use and Risk Category (non-Cropland)*

|  |  |  |
| --- | --- | --- |
| Pesticide Use and Risk | Existing Condition Score  Dry Climate | Existing Condition Score  Humid Climate |
| Low | 15 | 30 |
| None | 30 | 60 |

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water**

Table 97*:*  *Integrated Pest Management – IPM System for Field Pesticide Loss Water Quality Impacts*

Note: What kind of Integrated Pest Management (IPM) System is implemented on the PLU to manage pests and pesticide environmental risk?

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Pest Management Conservation System (Code 595) - Full IPM System for Efficient Production and Environmental Protection | 51 | A full IPM System is utilized including Prevention, Avoidance, Monitoring, and Suppression to manage pests (including invasive plants) to meet production needs and manage pesticide environmental risk. If this answer is selected, do NOT select Practice code 595 on the Existing or Planned Practices pages so as not to double count points. |
| Full IPM System for Efficient Production | 25 | A full IPM System is utilized including Prevention, Avoidance, Monitoring, and Suppression to manage pests (including invasive plants) to meet production needs. |
| No IPM System, but pesticides are used to manage pests. | 1 | An IPM System is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs. |
| No IPM System, but pesticides are used to manage pests and spray drift is minimized. | 1 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs, and pesticide drift is minimized with drift reducing spray technologies. |
| No IPM System, but pesticides are used to manage pests and the development of pest resistance is carefully managed. | 1 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to address production needs and the development of pest resistance is carefully managed. |
| No IPM System, but pesticides are used to manage pests, the development of pest resistance is carefully managed, and spray drift is minimized. | 1 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to address production needs, the development of pest resistance is carefully managed, and pesticide drift is minimized with drift reducing spray technologies. |
| No pesticides are used to manage pests. | 51 | Pests (including invasive plants) are managed to meet production needs without the use of pesticides. |
| No pesticides are used because pests are not managed. | 51 | Pests (including Invasive plants) are not managed (no pesticides are used) so production may be reduced beyond tolerable limits. |

## **Pathogens and Chemicals from Manure, Biosolids, or Compost Applications Transported to Surface Water**

### Component: Nonpoint pathogen surface loss

**Description:** Pathogens, pharmaceuticals, and chemicals from land applied manure, biosolids or compost are transported to surface waters in quantities that degrade water quality and limit its use.

**Objective:** Reduce nonpoint pathogen, pharmaceutical, and chemical transport beyond the edge of the field from land applied manure, biosolids or compost, by requiring a level of conservation management that is appropriate for each site’s potential for nonpoint pathogen, pharmaceutical and chemical loss.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

Each PLU will default to a not assessed status for Nonpoint Pathogen Surface Loss. The planner will identify this resource concern based on site specific conditions. A threshold value of 50 will be set and the existing condition question will be triggered. The existing condition question will set the existing score as seen in

Table 98. The planner will identify this resource concern based on the application of manure, biosolids or compost, or the presence of domestic livestock on the PLU. Where identified, at least 50 points of mitigation will be required from appropriate conservation practices and activities, including Nutrient Management that utilizes application timing to avoid high runoff periods, incorporation to reduce runoff potential, and application setbacks to protect nearby surface water bodies, waste treatment practices that destroy potentially harmful pathogens, and Prescribed Grazing and other practices that can help manage livestock waste.

Table 98*: Manure, compost or biosolid application*

*Question hover text: Pathogens, pharmaceuticals, and chemicals from land applied manure, biosolids, or compost*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 60 |
| Left on the surface without incorporation | 0 |
| Injected or incorporated into the soil soon after application (less than 24 hours) | 51 |

## **Pathogens and Chemicals from Manure, Biosolids, or Compost Applications Transferred to Groundwater**

### Component: Nonpoint pathogen loss to groundwater

**Description:** Pathogens, pharmaceuticals, and chemicals from land applied manure, biosolids or compost are transported to groundwater in quantities that degrade water quality and limit its uses.

**Objective:** Reduce transport of pathogens, pharmaceuticals, leachate and polluting chemicals from manure, bio-solids, or compost to groundwater.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range**

Each PLU will default to a not assessed status for Nonpoint pathogen loss to groundwater. The planner will identify this resource concern based on site specific conditions. A threshold value of 50 will be set and the existing condition question will be triggered. The existing condition question will set the existing score as seen in Table 99. The planner will identify this resource concern based on the application of manure, biosolids or compost, or the presence of domestic livestock on the PLU. Where identified, at least 50 points of mitigation will be required from appropriate conservation practices and activities, including Nutrient Management that utilizes application timing to avoid high water table periods, waste treatment practices that destroy potentially harmful pathogens, and Prescribed Grazing and other practices that can help manage livestock waste.

Table 99*: Manure, compost or biosolid application*

*Question hover text: Pathogens, pharmaceuticals, and chemicals from land applied manure, biosolids, or compost*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 60 |
| Left on the surface without incorporation | 0 |
| Injected or incorporated into the soil soon after application (less than 24 hours) | 51 |

## **Salts Transported to Surface Water**

### Component: Salt loss to surface water

**Description:** Irrigation or rainfall runoff transports salts to receiving surface waters in quantities that degrade water quality and limit use for intended purposes.

**Objective:** Limit transfer of salts from PLU to receiving surface waters.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined**

Each PLU will default to a not assessed status for Salt Loss to Surface Water. The planner will identify this resource concern based on site-specific conditions such as being in a known salinity project area. Where identified, at least 50 points of salinity mitigation will be required from appropriate conservation practices and activities, including irrigation water management and irrigation tailwater recovery.

Table 100*: Salt Loss to Surface Water*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 60 |
| Yes - Is a concern but is NOT currently being managed | 0 |
| Yes - Is a concern and is being managed with irrigation water management and tail water recovery | 51 |

## **Salts Transported to Groundwater**

### Component: Salt loss to groundwater

**Description:** Irrigation or rainfall runoff transport salts to groundwater in quantities that degrade aquifer water quality and limit intended uses.

**Objective:** Limit loss of salts from PLU to groundwater.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined**

Each PLU will default to a not assessed status for salts – groundwater. The planner will identify this resource concern based on site-specific conditions such as being in a known salinity project area. Where identified, at least 50 points of salinity mitigation will be required from appropriate conservation practices and activities, including irrigation water management.

Table 101*: Salt Loss to Groundwater*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 60 |
| Yes - Is a concern but is NOT currently being managed | 0 |
| Yes - Is a concern but is being managed with the irrigation water management system | 51 |

## **Petroleum, Heavy Metals, and Other pollutants (ex. agrichemical mix sites) Transported to Surface Water**

### Component 1: Concentrated agrichemical runoff loss and storage and handling of fertilizer and pesticides

**Description:** Agrichemical products (fertilizers and pesticides) are stored, mixed, loaded, or handled onsite, so they have the potential to contaminant surface waters.

**Objective:** Control accidental release of agrichemical products from storage/loading/mixing sites to prevent contamination of surface waters by use of secondary containment (impervious surface which would catch and prevent incidental spillage).

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined, Water**

The planner will identify this resource concern based on site-specific conditions. A planning threshold value of 50 will be set and the existing condition question will be triggered. The existing condition question will set the existing score as seen in Table 102.

Table 102*: Agrichemical Product Storage (Pesticides and Fertilizers)*

Note: Are agrichemical products stored, mixed, loaded, or handled on the PLU?

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 60 |
| Yes - ARE stored, mixed, loaded, or handled on PLU AND secondary containment is NOT in place | 0 |
| Yes - ARE stored, mixed, loaded, or handled on PLU AND secondary containment IS in place | 51 |

### Component 2: Petroleum and other pollutant containment to surface water

**Description:** Petroleum products >1000 gallons are stored and handled on site without on-farm secondary containment facility where one would be needed (catchment which would catch and prevent incidental spillage), so the potential exists to contaminate surface waters. As well, heavy metals or other pollutants are present on the PLU from mining operations or other activities including storage and handling. Materials containing these pollutant types are present, stored or handled on site, so they have the potential to contaminate surface waters. The planner will identify this resource concern based on site-specific conditions.

**Objective:** Control accidental release of stored petroleum products and other pollutants to prevent contamination of surface waters.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined, Water**

The planner will identify this resource concern based on site-specific conditions. A planning threshold value of 50 will be set and the existing condition question will be triggered. The existing condition question will set the existing score as seen in Table 103.

Table 103*: Petroleum* *products stored and handled on the PLU*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 60 |
| Yes - ARE stored and handled on the PLU, but secondary containment is **NOT** in place. | 0 |
| Yes - ARE stored and handled on the PLU and secondary containment IS in place that meets the minimum assessment threshold. | 51 |

### Component 3: Mine waste remediation and containment - surface water

**Description:** Mining operations on the PLU have the potential to contaminate surface waters, including heavy metals or other mining effluent pollutants. Mine waste and materials containing pollutants are present, generated, released, stored or handled on site, so they have the potential to contaminate surface waters. The planner will identify this resource concern based on site-specific conditions.

**Objective:** Control release of mine waste and materials containing pollutants to prevent contamination of surface waters.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined, Water**

The planner will identify this resource concern based on site-specific conditions. A planning threshold value of 50 will be set and the existing condition question (Yes/No) will be triggered. The existing condition question will set the existing score as seen in Table 104.

Table 104*: Mine Waste Pollutants Present on the PLU*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 60 |
| Yes - present on the PLU, and adequate control or treatment is NOT in place | 0 |
| Yes - present on the PLU, but adequate control or treatment **IS** in place | 51 |

## **Petroleum, Heavy Metals, and Other Pollutants Transported to Groundwater**

### Component 1: Concentrated agrichemical leaching loss and storage and handling of fertilizer and pesticides

**Description:** Agrichemical products (fertilizers and pesticides) are stored, mixed, loaded, or handled onsite, so they have the potential to contaminant groundwater.

**Objective:** Control accidental release of agrichemical products from storage/loading/mixing sites to prevent contamination of groundwater by use of secondary containment (impervious surface which would catch and prevent incidental spillage).

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined, Water**

The planner will identify this resource concern based on site-specific conditions. A planning threshold value of 50 will be set and the existing condition question will be triggered. The existing condition question will set the existing score as seen in Table 105.

Table 105*: Agrichemical Product Storage (Pesticides and Fertilizers)*

Note: Are agrichemical products stored, mixed, loaded, or handled on the PLU?

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 60 |
| Yes - ARE stored, mixed, loaded, or handled on PLU AND secondary containment is NOT in place | 0 |
| Yes - ARE stored, mixed, loaded, or handled on PLU AND secondary containment IS in place | 51 |

### Component 2: Petroleum and other pollutant containment to groundwater

**Description:** Petroleum products >1000 gallons are stored and handled on site without secondary containment facility where one would be needed (catchment which would catch and prevent incidental spillage), so the potential exists to contaminate groundwater. As well, other pollutants are present on the PLU from other activities including storage and handling. Materials containing these pollutant types are present, stored or handled on site, so they have the potential to contaminate groundwater. The planner will identify this resource concern based on site-specific conditions.

**Objective:** Control accidental release of stored petroleum products and other pollutants to prevent contamination of groundwaters.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined, Water**

A planning threshold value of 50 will be set and the existing condition question (Yes/No) will be triggered. The existing condition question will set the existing score as seen in Table 106 below.

Table 106*:* Petroleum products stored on the PLU

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 60 |
| Yes - ARE stored and handled on the PLU, but secondary containment is **NOT** in place. | 0 |
| Yes - ARE stored and handled on the PLU and secondary containment IS in place that meets the minimum assessment threshold. | 51 |

### Component 3: Mine waste remediation and containment - groundwater

**Description:** Mining operations on the PLU have the potential to contaminate surface waters, including heavy metals or other mining effluent pollutants. Mine waste and materials containing pollutants are present, generated, released, stored or handled on site, so they have the potential to contaminate groundwater. The planner will identify this resource concern based on site-specific conditions.

**Objective:** Control release of mine waste and materials containing pollutants to prevent contamination of groundwater.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined, Water**

The planner will identify this resource concern based on site-specific conditions. A planning threshold value of 50 will be set and the existing condition question (Yes/No) will be triggered. The existing condition question will set the existing score as seen in Table 107 below.

Table 107*: Mine Waste Pollutants Present on the PLU*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 60 |
| Yes - present on the PLU, and adequate control or treatment is NOT in place | 0 |
| Yes - present on the PLU, but adequate control or treatment **IS** in place | 51 |

## **Sediment Transported to Surface Water**

### Component: Sediment from erosion sources

**Description:** Offsite transport of sediment to surface waters degrades water quality and limits use for intended purposes.

**Objective:** Limit sediment loss from site to surface waters.

**Analysis within CART:**

**Crop**

For sediment from sheet and rill erosion on cropland, each PLU will have the PLU soil runoff potential determined. Each soil map unit within the PLU will be categorized into one of four soil runoff potentials through the Water Quality Management Services - Soil Runoff, based on its published map unit components corresponding to the charts in Table 108, Table 109, and Table 110. The acre weighted average rating for the PLU is then determined based on ratings for each soil map unit in the PLU.

Table 108*: Soil Runoff Potential: Drained/No High Water Table*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Soil Runoff Potential | A | B | C | D |
| Low =0 | ALL | Slope < 4 | Slope < 2 | Slope < 2 AND kfactor < 0.28 |
| Moderate =1 | - | Slope >= 4 AND Slope <= 6 AND kfactor < 0.32 | Slope >= 2 AND slope <= 6 AND kfactor < 0.28 | Slope < 2 AND kfactor >= 0.28 |
| Moderately High =2 | - | Slope>= 4 AND slope <= 6 AND kfactor >= 0.32 | slope>= 2 AND slope <= 6 AND kfactor >= 0.28 | (slope>= 2 AND slope <= 4) |
| High =3 | - | Slope > 6 | Slope > 6 | Slope > 4 |

Table 109*: Soil Runoff Potential: If High Water Table Kind is Perched or Apparent and High Water Table is <= 61 cm AND Not Drained*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Soil Runoff Potential | A | B | C | D |
| Low =0 | - | - | - | - |
| Moderate =1 | - | - | - | - |
| Moderately High =2 | - | - | - | - |
| High =3 | All | All | All | All |

Table 110*:* *Soil Runoff Potential: Dual hydrologic soil groups A/D, BD, C/D that are not drained*

|  |  |  |  |
| --- | --- | --- | --- |
| Soil Runoff Potential | A/D | B/D | C/D |
| Low =0 | - | - | - |
| Moderate =1 | - | - | - |
| Moderately High =2 | - | - | - |
| High =3 | All | All | All |

Using the R factor from R factor service, the PLU soil runoff potential is used to determine the threshold of conservation management points necessary to meet the assessment threshold, as seen in Table 111.

Table 111*: Determining Sediment Transport Threshold*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Runoff Vulnerability | R Factor | | | |
| ≤50 | >50-150 | >150-250 | >250 |
| High | 5 | 50 | 85 | 100 |
| Moderately High | 5 | 30 | 50 | 85 |
| Moderate | 1 | 15 | 40 | 50 |
| Low | 1 | 1 | 25 | 40 |

The existing condition question will set the existing score for Cropland as seen in Table 112.

Table 112*: Existing Rotation Residue Value*

|  |  |
| --- | --- |
| **Existing Condition - Crop Rotation Credits** Existing condition credits are based on system benefits for cover/residue/biomass of all crops and cover crops in the rotation combined with the effects of harvesting, grazing and tillage. ***Note that individual points for associated practices like crop rotation, cover crop and residue management are added in addition to this system level credit.***  Bulleted items are intended to be used as a guide to the current organic matter condition. Additional State guidance may be required. | Sediment from Erosion Credit |
| **None – Rapidly Depleting Soil Organic Matter**   * Fallow (bare or chemical fallow) for significant portions of the management system * Crops with fragile residue * Multiple full-width tillage passes | 0 |
| **Low – Depleting Soil Organic Matter**   * A mix of crops with fragile and non-fragile residue * Partial width or limited full-width tillage | 10 |
| **Moderate – Maintaining Soil Organic Matter**   * Crop rotations with predominately non-fragile residue * May include cover crops * Part of the rotation in high residue crops * No full-width tillage or tillage passes minimize soil disturbance | 20 |
| **High – Building Soil Organic Matter**   * Crop rotations with high residue crops * Includes cover crops or perennial crops (including hay and green manures) with full ground cover * Not tilled or tilled infrequently during the rotation | 40 |

This Resource Concern is evaluated on Cropland with variable thresholds based on soils and R factor and mitigated with the Existing Condition question for SCI Crop Rotation and selected practices.

**All other applicable land uses:**

Below are the same existing condition questions and points used in the Sheet and rill erosion component to evaluate Sediment from erosion sources on non-cropland.

**Associated Agriculture Land, Developed Land, Farmstead, Forest, Other Rural Land, Water**

If the Resource concern component is applicable the planner will identify this resource concern based on site-specific conditions. A threshold value of 50 will be set and the existing condition question will be triggered. The existing condition question will set the existing score as seen in Table 113.

Table 113: *Sheet and Rill Erosion Existing Condition*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Site is stable and without visible signs of active erosion. | 51 |
| Site is NOT stable and has visible signs of active erosion. | 1 |

**Pasture**

For Pasture land uses, a standard threshold of 50 is set. This component will be addressed by answering the Pasture Condition Score Sheet (PCS) existing condition questions in Table 114, Table 115, and Table 116.

Table 114: *Pasture - Plant Vigor*

*Question hover text: Established using Pasture Condition Score Sheet for Plant Vigor OR determining Indicators of Pasture Health (DIPH) for Plant Vigor*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| High | 20 | * Rapid recovery of desirable forage. All healthy green forage. * Pasture Condition Score element score = 5   OR   * DIPH Rating = None to slight departure for Plant Vigor Indicator #17 |
| Good | 17 | * Good recovery of desirable forage. Light green and dark green forage present. * Pasture Condition Score element score = 4   OR   * DIPH Rating = Slight to moderate departure for Plant Vigor Indicator #17 |
| Fair | 10 | * Adequate recovery of desirable forage. Yellowish and dark green areas due to manure and urine patches. * Pasture Condition Score element score = 3   OR   * DIPH Rating = Moderate departure for Plant Vigor Indicator #17 |
| Low | 5 | * Some recovery. Yellowish green forage, or moderately or sight stunting of desirable forage. * Pasture Condition Score element score = 2   OR   * DIPH Rating = Moderate to extreme departure for Plant Vigor Indicator #17 |
| Poor | 1 | * No plant recovery after grazing/harvest. Pale, yellow or brown, or severe stunting of desirable forage. * Pasture Condition Score element score = 1   OR   * DIPH Rating = Extreme to total departure for Plant Vigor Indicator #17 |

Table 115: *Pasture –Plant Cover*

*Question hover text: Pasture Condition Score Live or Dormant Plant Cover or Determining Indicators of Pasture Health (DIPH)*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| High | 20 | * More than 95% live (non-dormant) leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 5   OR   * DIPH Rating = None to slight departure for Live Plant Foliar Cover Indicator #12 |
| Good | 17 | * 81-95% live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 4   OR   * DIPH Rating = Slight to moderate departure for Live Plant Foliar Cover Indicator #12 |
| Fair | 10 | * 66-80% live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 3   OR   * DIPH Rating = Moderate departure for Live Plant Foliar Cover Indicator #12 |
| Low | 5 | * 40-65% is live leaf canopy Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 2   OR   * DIPH Rating = Moderate to extreme departure for Live Plant Foliar Cover Indicator #12 |
| Poor | 1 | * Less than 40% is live leaf canopy. Remaining is either dead standing material, or bare ground.   Pasture Condition Score element score = 1  OR   * DIPH Rating = Extreme to total departure for Live Plant Foliar Cover Indicator #12 |

Table 116: *Pasture – Erosion*

*Question hover text: Pasture Condition Score Sheet for Erosion OR Determining Indicators of Pasture Health (DIPH) for Erosion*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| High | 20 | * Sheet and Rill: Plant density high, no runoff, good infiltration. No evidence of present or past erosion. * Pasture Condition Score element score = 5   OR   * DIPH Rating = None to slight departure for Erosion (sheet and rill) Indicator #1 |
| Good | 17 | * Sheet and Rill: Plant density high, runoff low, good infiltration. May have evidence of past erosion if present. * Pasture Condition Score element score = 4   OR   * DIPH Rating = Slight to moderate departure for Erosion (sheet and rill) Indicator #1 |
| Fair | 10 | * Sheet and Rill: Plant density good and runoff moderate. If present, erosion concentrated on heavily used areas. * Pasture Condition Score element score = 3   OR   * DIPH Rating = Moderate departure for Erosion (sheet and rill) Indicator #1 |
| Low | 5 | * Sheet and Rill: Plant density slows runoff. Erosion present and easily seen on steeper terrain. * Pasture Condition Score element score = 2   OR   * DIPH Rating = Moderate to extreme departure for Erosion (sheet and rill) Indicator #1 |
| Poor | 1 | * Sheet and Rill: Plant density is insufficient to stop runoff and poor infiltration. Erosion easily visible throughout pasture. * Pasture Condition Score element score = 1   OR   * DIPH Rating = Extreme to total departure for Erosion (sheet and rill) Indicator #1 |

**Range**

For Range land uses, a standard threshold of 50 is set. This component will be addressed by answering the Interpreting Indicators of Rangeland Health (IIRH) question in Table 117.

Table 117: *Rangeland Health - Soil/Site Stability Limitations*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Existing Condition |
| None to Slight | 60 | Interpreting Indicators of Rangeland Health (most current version) |
| Slight to Moderate | 51 | Interpreting Indicators of Rangeland Health (most current version) |
| Moderate | 30 | Interpreting Indicators of Rangeland Health (most current version) |
| Moderate to Extreme | 15 | Interpreting Indicators of Rangeland Health (most current version) |
| Extreme to Total | 1 | Interpreting Indicators of Rangeland Health (most current version) |

# **Air**

## **Emissions of Particulate Matter (PM) and PM Precursors**

### Component 1: PM – diesel engines

**Description:** Direct emissions of particulate matter (PM) - dust and smoke - as well as the formation of fine particulate matter in the atmosphere from other agricultural emissions - ammonia, nitrogen oxides (NOx), and volatile organic compounds (VOCs) - can cause multiple negative environmental impacts.

**Objective:** Emissions of PM and PM precursors from diesel engines do not excessively contribute to negative impacts to human, plant, or animal health and do not excessively contribute to regional visibility degradation.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Pasture, Range**

A threshold value of 50 will be set, and the combustion sources existing condition question will be triggered for diesel engines.

Each PLU will trigger an intersection with the PM2.5 and PM10 nonattainment geospatial data.

The existing condition question will set the existing condition score as seen in Table 118.

Table 118*: Diesel Engine Combustion Sources Existing Condition*

*Question hover text. If there are no diesel engines in operation at the PLU, this component is not applicable. Otherwise, document all diesel engines larger than 25 brake horsepower, including engine horsepower rating, model year, and annual hours of usage.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Not applicable | 100 |  |
| Low risk combustion sources | 81 | All diesel engines larger than 25 brake horsepower in operation at the PLU are certified to EPA Tier 4 final standards (based on engine model year and horsepower rating). See Appendix D for an EPA Tier chart. |
| Medium risk combustion sources | 51 | All diesel engines larger than 25 brake horsepower in operation at the PLU are certified to at least EPA Tier 3 standards (based on engine model year and horsepower rating). See Appendix D for an EPA Tier chart. |
| High risk combustion sources | 1 | Not all diesel engines larger than 25 brake horsepower in operation at the PLU are certified to at least EPA Tier 3 standards (based on engine model year and horsepower rating). See Appendix D for an EPA Tier chart. |

### Component 2: PM – non-engine combustion equipment

**Description:** Emissions of PM and PM precursors from non-diesel engine combustion equipment do not excessively contribute to negative impacts to human, plant, or animal health and do not excessively contribute to regional visibility degradation.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Pasture, Range**

A threshold value of 50 will be set.

Each PLU will trigger an intersection with the PM2.5 and PM10 nonattainment geospatial data.

The existing condition question will set the existing condition score as seen in Table 119.

Table 119*: Non-Engine Combustion Sources* *Existing Condition*

*Question hover text: If there are no non-engine combustion sources in operation at the PLU, this component is not applicable. Otherwise, document all non-engine combustion sources, including heat input rating, fuel type, and annual hours of usage.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Not applicable | 100 |  |
| Low risk combustion sources | 81 | At minimum one of the following must be met:   * All non-diesel engine combustion sources utilize natural gas or propane as fuel * Other emissions control for PM and NOx emissions are employed for all non-diesel engine combustion sources |
| Medium risk combustion sources | 51 | **For PM attainment areas:** At minimum one of the following must be met:   * At least 50% of the normal annual fuel usage for non-diesel engine combustion sources in operation at the PLU is either natural gas or propane * At least 50% of the non-diesel engine combustion sources in operation at the PLU utilize emissions control for PM and NOx emissions.   **For PM nonattainment areas:** At minimum one of the following must be met:   * At least 75% of the normal annual fuel usage for non-diesel engine combustion sources in operation at the PLU is either natural gas or propane * At least 75% of the non-diesel engine combustion sources in operation at the PLU utilize emissions control for PM and NOx emissions. |
| High risk combustion sources | 1 | **For PM attainment areas:** At minimum one of the following must be met:   * Less than 50% of the normal annual fuel usage for non-diesel engine combustion sources in operation at the PLU is either natural gas or propane * Less than 50% of the non-diesel engine combustion sources in operation at the PLU utilize emissions control for PM and NOx emissions.   **For PM nonattainment areas:** At minimum one of the following must be met:   * Less than 75% of the normal annual fuel usage for non-diesel engine combustion sources in operation at the PLU is either natural gas or propane * Less than 75% of the non-diesel engine combustion sources in operation at the PLU utilize emissions control for PM and NOx emissions. |

### Component 3: PM – open burning

**Description:** Emissions of PM and PM precursors from fire do not excessively contribute to negative impacts to human, plant, or animal health and do not result in safety or nuisance visibility restrictions.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Pasture, Range**

A threshold value of 50 will be set, and the existing condition question will set the existing condition score as seen in Table 120.

Table 120*: Are you using fire for management?*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable – Fire is not used for management on the PLU | 100 |
| Fire is used for management on the PLU, and basic smoke management practices ARE implemented | 51 |
| –Fire is used for management on the PLU, and basic smoke management practices are NOT implemented | 1 |

If fire is not applied at the PLU, this component is not applicable.

If less than 100% of all fire events at the PLU are conducted using Basic Smoke Management Practices, apply Prescribed Burning (338) to develop, implement, and follow a prescribed burn plan that includes Basic Smoke Management Practices for all fire events. Additional practices may be necessary to support Prescribed Burning (338).

### Component 4: PM – pesticide drift

**Description:** Pesticide use does not result in unwanted chemical droplet drift.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Pasture, Range**

The Planner may identify a Particulate Matter resource concern for this component based on site specific conditions. A threshold value will be set at 50.

The existing condition questions will set the existing condition score.

Table 121*:* *Integrated Pest Management – IPM System for Air Quality Impacts*

*Question hover text: If there is no chemical pesticide application at the PLU, component PM-pesticide drift, is not applicable.*

Note: What kind of Integrated Pest Management (IPM) System is implemented on the PLU to manage pests and pesticide environmental risk?

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Pest Management Conservation System (Code 595) - Full IPM System for Efficient Production and Environmental Protection | 51 | A full IPM System is utilized including Prevention, Avoidance, Monitoring, and Suppression to manage pests (including invasive plants) to meet production needs and manage pesticide environmental risk, including Windows Pesticide Screening Tool results for risks to water quality. If this answer is selected, do NOT select Practice code 595 on the Existing or Planned Practices pages so as not to double count points. |
| Full IPM System for Efficient Production | 51 | A full IPM System is utilized including Prevention, Avoidance, Monitoring, and Suppression to manage pests (including invasive plants) to meet production needs. |
| No IPM System, but pesticides are used to manage pests. | 1 | An IPM System is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs. |
| No IPM System, but pesticides are used to manage pests and spray drift is minimized. | 51 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs, and pesticide drift is minimized with drift reducing spray technologies. |
| No IPM System, but pesticides are used to manage pests and the development of pest resistance is carefully managed. | 1 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to address production needs and the development of pest resistance is carefully managed. |
| No IPM System, but pesticides are used to manage pests, the development of pest resistance is carefully managed, and spray drift is minimized. | 51 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to address production needs, the development of pest resistance is carefully managed, and pesticide drift is minimized with drift reducing spray technologies. |
| No pesticides are used to manage pests. | 100 | Pests (including invasive plants) are managed to meet production needs without the use of pesticides. |
| No pesticides are used because pests are not managed. | 51 | Pests (including Invasive plants) are not managed (no pesticides are used) so production may be reduced beyond tolerable limits. |

### Component 5: PM – nitrogen fertilizer

**Description:** Emissions of ammonia (a PM precursor) from nitrogen fertilizer application do not excessively contribute to negative impacts to human, plant, or animal health and do not excessively contribute to regional visibility degradation.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Forest, Pasture**

The Planner may identify a Particulate Matter resource concern for this component based on site specific conditions. A threshold value will be set at 50.

The existing condition question will set the existing condition score as seen in Table 122.

Table 122*: Nutrient Application – Nitrogen impacts to Air Quality*

*Question hover text: Includes organic and inorganic nutrients applied mechanically or by hand. Does NOT include nutrients deposited by grazing animals when these are the only nutrients applied.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| No nutrients applied | 51 | No organic or inorganic nutrients are applied mechanically or by hand. Note that this does not include nutrients deposited by grazing animals when these are the only nutrients applied to the PLU. |
| Nutrients are applied | 1 | Organic or inorganic nutrients are applied to the PLU mechanically or by hand. |

If there is no NRCS-approved nutrient management plan that specifically addresses nitrogen for the PLU, apply Nutrient Management (590) to develop such a plan.

### Component 6: PM – dust from field operations

**Description:** Mechanically-generated emissions of PM from field operations (including tillage, seed bed preparation, planting, harvest operations, or any combination of these) do not excessively contribute to negative impacts to human, plant, or animal health; do not excessively contribute to unwanted deposition on surfaces; and do not result in safety or nuisance visibility restrictions.

**Analysis within CART:**

**Crop, Pasture**

The Planner may identify a Particulate Matter resource concern for this component based on site specific conditions. A threshold value will be set at 50.

If field operations are not conducted at the PLU, this component is not applicable. The existing condition questions will set the existing condition score as seen in Table 123.

Table 123*:* *Dust from Field Operations*

Note: Has the client or planner observed any PM/dust issues related to field operations at the PLU, and have any practices or techniques been previously applied to address the observed PM/dust issues?

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Not applicable | 100 | No PM/dust issues related to field operations at the PLU |
| Minimal potential for dust | 51 | Neither the Planner or client has observed any PM/dust issues related to field operations at the PLU |
| Significant potential for dust | 1 | Planner or client has observed PM/dust issues related to field operations at the PLU |

If there have been previous PM/dust issues from field operations, and practices have not been previously applied, Conservation Practices and Activities can be applied.

### Component 7: PM – dust from unpaved roads

**Description:** Emissions of PM from vehicle and machinery travel on unpaved roads and surfaces do not excessively contribute to negative impacts to human, plant, or animal health; do not excessively contribute to unwanted deposition on surfaces; and do not result in safety or nuisance visibility restrictions.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Other Rural Land, Range, Pasture**

The Planner may identify a Particulate Matter resource concern for this component based on site specific conditions. A threshold value will be set at 50.

The existing condition questions will set the existing condition score as seen in Table 124.

Table 124*: Dust from Unpaved Roads*

*Question hover text: If there are no unpaved roads or other unpaved travel surfaces used for vehicle or machinery movement at the PLU, this component is not applicable. Has the client or planner observed any PM/dust issues related to vehicle travel on unpaved roads and surfaces at the PLU, and have any practices or techniques been previously applied to address the observed PM/dust issues?*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Not Applicable | 100 | No PM/dust issues related to vehicle travel on unpaved roads at the PLU |
| Minimal potential for dust | 51 | Neither the Planner or client has observed any PM/dust issues related to vehicle travel on unpaved roads at the PLU |
| Significant potential for dust | 1 | Planner or client has observed PM/dust issues related to vehicle travel on unpaved roads at the PLU |

### Component 8: PM – windblown dust

**Description:** Wind-generated emissions of PM do not excessively contribute to negative impacts to human, plant, or animal health; do not excessively contribute to unwanted deposition on surfaces; and do not result in safety or nuisance visibility restrictions.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Other Rural Land, Range, Pasture**

The Planner may identify a Particulate Matter resource concern for this component based on site specific conditions. A threshold value will be set at 50. The wind erosion existing condition question will be triggered and used to answer this component.

Table 125*: Windblown Dust*

*Question hover text: Has the client or planner observed any windblown PM/dust issues at the PLU, and have any practices or techniques been previously applied to address the observed PM/dust issues?*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Not Applicable | 100 | No windblown PM/dust issues at the PLU |
| Minimal potential for dust | 51 | Neither the Planner or client has observed any windblown PM/dust issues at the PLU |
| Significant potential for dust | 1 | Planner or client has observed windblown PM/dust issues at the PLU |

### Component 9: PM – confined animal activities

**Description:** Emissions of PM and PM precursors from confinement-based animal production do not excessively contribute to negative impacts to human, plant, or animal health; do not excessively contribute to regional visibility degradation; and do not result in safety or nuisance visibility restrictions.

**Analysis within CART:**

**Farmstead**

The Planner may identify a Particulate Matter resource concern for this component based on site specific conditions. A threshold value will be set at 50.

The existing condition questions will set the existing condition score as seen in Table 126.

Table 126*: Dust from Confinement-Based Animal Operations*

*Question hover text: If there are no livestock present on the PLU, this component is not applicable. Has the client or planner observed any PM/dust issues related to confinement-based animal production at the PLU, and have any practices or techniques been previously applied to address the observed PM/dust issues?*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Not Applicable | 100 | No PM/dust issues related to confinement-based animal production at the PLU |
| Minimal potential for dust | 51 | Neither the Planner or client has observed any PM/dust issues related to confinement-based animal production at the PLU |
| Significant potential for dust | 1 | Planner or client has observed PM/dust issues related to confinement-based animal production at the PLU |

## **Emissions of Greenhouse Gases (GHGs)**

### Component 1: GHGs – nitrogen fertilizer

**Description:** Emissions of greenhouse gases from agricultural operations increase atmospheric concentrations of these gases.

**Objective:** Emissions of nitrous oxide from nitrogen fertilizer application do not excessively contribute to increased atmospheric concentrations of greenhouse gases.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Forest, Pasture**

The Planner may identify a Greenhouse Gas resource concern for this component based on site specific conditions. A threshold value will be set at 50.

The existing condition question will set the existing condition score as see in Table 127.

Table 127*: Nutrient Application – Nitrogen impacts to Air Quality*

*Question hover text: Includes organic and inorganic nutrients applied mechanically or by hand. Does NOT include nutrients deposited by grazing animals when these are the only nutrients applied.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| No nutrients applied | 100 | No organic or inorganic nutrients are applied mechanically or by hand. Note that this does not include nutrients deposited by grazing animals when these are the only nutrients applied to the PLU. |
| Nutrients are applied | 1 | Organic or inorganic nutrients are applied to the PLU mechanically or by hand. |

If there is no NRCS-approved nutrient management plan that specifically addresses nitrogen for the PLU, apply Nutrient Management (590) to develop such a plan.

### Component 2: GHGs – carbon stock

**Description:** Maintain or increase total carbon stored in soils and/or perennial biomass to reduce atmospheric concentrations of carbon dioxide and enhance carbon sequestration.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Forest, Pasture, Range**

The Planner may identify a Greenhouse Gas resource concern for this component based on site specific conditions. A threshold value will be set at 50 and the following existing condition questions will be triggered.

In the future, soil organic carbon stock will be identified by geospatial data (see <https://jneme910.github.io/CART/chapters/Soil_Organic_Carbon_Stock>).

Table 128*: Strategy exists for maintaining or increasing carbon stocks for air quality*

*Question hover text: In soils and perennial biomass being implemented at the PLU.*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not Applicable | 100 |
| No – carbon stocks stable/increasing | 51 |
| No – carbon stocks decreasing | 1 |
| Yes – carbon stocks stable/increasing | 75 |
| Yes – carbon stocks decreasing | 25 |

If the client is not implementing a strategy for maintaining or increasing carbon stocks in soils and perennial biomass at the PLU, the Planner will make a determination of whether or not a resource concern exists for this Component for carbon stocks. The resource concern determination for carbon stocks will include an analysis of the PLU using COMET-Farm to analyze overall carbon stocks in soils and perennial biomass at the PLU. If the analysis shows that overall carbon stocks in soils and perennial biomass are stable or increasing, an existing score of 51 will be applied. If the analysis shows that overall carbon stocks in soils and perennial biomass are decreasing, an existing score of 1 will be applied. Conservation Practices and Activities related to maintaining or increasing carbon stocks in soils and perennial biomass are determined based on an alternative scenario analysis of the PLU using COMET-Farm and are added to the existing condition to determine the state of the planned management system.

### Component 3: GHGs – hydric & organic soils

**Description:** Maintain or increase total carbon stored in soils and/or perennial biomass to reduce atmospheric concentrations of carbon dioxide and enhance carbon sequestration.

**Analysis within CART:**

**Associated Agriculture Land. Crop, Forest, Pasture, Range**

The Planner may identify a Greenhouse Gas resource concern for this component based on site specific conditions. A threshold value will be set at 50 and the following existing condition questions will be triggered:

Table 129*: Hydric or organic soils at the PLU*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Score | Reference for Assessment Condition |
| Not applicable | 100 |  |
| All undrained hydric and undrained organic soils with perennial cover | 51 | All undrained hydric and undrained organic soils at the PLU are maintained with perennial cover |
| < 100% of undrained hydric and undrained organic soils with perennial cover | 1 | < 100% of undrained hydric and undrained organic soil acreage is maintained with perennial cover |

If less than 100% of undrained hydric and organic soils at the PLU are maintained with perennial cover, apply Conservation Cover (327) to ensure that 100% of undrained hydric and undrained organic soils at the PLU are maintained with perennial cover. Additional practices may be necessary to support Conservation Cover (327).

### Component 4: GHGs – confined animal activities

**Description:**  Emissions of methane and nitrous oxide from confinement-based livestock production do not excessively contribute to increased atmospheric concentrations of greenhouse gases.

**Analysis within CART:**

**Farmstead**

The Planner may identify a Greenhouse Gas resource concern for this component based on site specific conditions. A threshold value will be set at 50.

If there is no confinement-based livestock production at the PLU, this component is not applicable. The existing condition questions will set the existing condition score as seen in Table 130 and Table 131.

Table 130: *Manures or compost stockpiled or stored on the PLU with potential Air Quality Impacts*

*Question hover text: Associated with confined animal activities.*

Note: Are they stockpiled or stored on the PLU?

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 100 |
| Only solid material storage - contained | 21 |
| Only solid material storage - not contained | 1 |
| Liquid or mixed manure storage – contained | 11 |
| Liquid or mixed manure storage – contained, aerobic or covered | 21 |
| Liquid or mixed manure storage - not contained | 1 |

If a Greenhouse Gas resource concern is determined to exist for methane emissions from confinement-based animal production for this component, Conservation Practices and Activities related to reducing Greenhouse Gas emissions from confinement‑based livestock or poultry production are determined based on an alternative scenario analysis of the PLU using the National Air Quality Site Assessment Tool (NAQSAT – [http://naqsat.tamu.edu](http://naqsat.tamu.edu/)) and the USDA/EPA Agricultural Air Quality Conservation Measures Guide for Poultry and Livestock Production and are added to the benchmark condition to determine the state of the planned management system.

Table 131*: Feed Management Plan or Strategy to Manage Nitrogen Excretion*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Score | Reference for Assessment Condition |
| Feed management plan or strategy to manage nitrogen excretion | 30 | The client can certify that a feed management plan or strategy is in place to manage nitrogen excretion. |
| No feed management plan or strategy to manage nitrogen excretion | 1 | A feed management plan or strategy to manage nitrogen excretion is not being implemented at the PLU. |

### Component 5: GHGs – grazing operations

**Description:** Emissions of methane from grazing livestock operations do not excessively contribute to increased atmospheric concentrations of greenhouse gases.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Forest, Pasture, Range**

The Planner may identify a Greenhouse Gas resource concern for this component based on site specific conditions. If there are no grazing animals at the PLU, this component is not applicable. The threshold value will be set at 50, and the existing condition question will be triggered:

Table 132: *Grazing Management Plan is Implemented at the PLU that impacts GHGs*

*Question hover text: Purpose of the Grazing Management Plan is to balance the energy and nutrition requirements of the grazing animals with the productivity of the grazing lands.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Score | Additional Information |
| Not applicable | 100 |  |
| Yes | 51 | The client can certify that a grazing management plan to balance the energy and nutrition requirements of the grazing animals with the productivity of the grazing lands is being implemented at the PLU. |
| No | 1 | A grazing management plan to balance the energy and nutrition requirements of the grazing animals with the productivity of the grazing lands is not being implemented at the PLU. |

If a grazing management plan to balance the energy and nutrition requirements of the grazing animals with the productivity of the grazing lands is not being implemented at the PLU, apply Prescribed Grazing (528) to develop, implement, and follow a prescribed grazing plan that balances the energy and nutrition requirements of the grazing animals with the productivity of the grazing lands. Additional practices may be necessary to support Prescribed Grazing (528).

## **Emissions of Ozone Precursors (Ozone Precursors)**

### Component 1: Ozone – diesel engines

**Description:** Emissions of ozone precursors (NOx and VOCs) result in formation of ground-level ozone, which can have negative impacts to human, plant, and animal health.

**Objective:** Emissions of ozone precursors from diesel engines do not excessively contribute to negative impacts to human, plant or animal health.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Pasture, Range**

A threshold value of 50 will be set, and the existing condition question will be triggered.

Each PLU will trigger an intersection with the Ozone nonattainment geospatial data.

The existing condition question will set the existing condition score as seen in Table 133.

Table 133*: Diesel Engine Combustion Sources Existing Condition*

*Question hover text. If there are no diesel engines in operation at the PLU, this component is not applicable. Otherwise, document all diesel engines larger than 25 brake horsepower, including engine horsepower rating, model year, and annual hours of usage.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | **Reference for Assessment Condition** |
| Not applicable | 100 |  |
| Low risk combustion sources | 81 | All diesel engines larger than 25 brake horsepower in operation at the PLU are certified to EPA Tier 4 final standards (based on engine model year and horsepower rating). See Appendix D for an EPA Tier chart. |
| Medium risk combustion sources | 51 | All diesel engines larger than 25 brake horsepower in operation at the PLU are certified to at least EPA Tier 3 standards (based on engine model year and horsepower rating). See Appendix D for an EPA Tier chart. |
| High risk combustion sources | 1 | Not all diesel engines larger than 25 brake horsepower in operation at the PLU are certified to at least EPA Tier 3 standards (based on engine model year and horsepower rating). See Appendix D for an EPA Tier chart. |

### Component 2: Ozone – non-engine combustion equipment

**Description:** Emissions of ozone precursors from non-diesel engine combustion equipment do not excessively contribute to negative impacts to human, plant, or animal health.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Pasture, Range**

A threshold value of 50 will be set.

Each PLU will trigger an intersection with the Ozone nonattainment geospatial data.

The existing condition question will set the existing condition score as seen in Table 134.

Table 134*: Non-Engine Combustion Sources Existing Condition*

*Question hover text: If there are no non-engine combustion sources in operation at the PLU, this component is not applicable. Otherwise, document all non-engine combustion sources, including heat input rating, fuel type, and annual hours of usage.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Not applicable | 100 |  |
| Low risk combustion sources | 81 | At minimum one of the following must be met:   * All non-diesel engine combustion sources utilize natural gas or propane as fuel * Other emissions control for PM and NOx emissions are employed for all non-diesel engine combustion sources |
| Medium risk combustion sources | 51 | **For Ozone attainment areas:** At minimum one of the following must be met:   * At least 50% of the normal annual fuel usage for non-diesel engine combustion sources in operation at the PLU is either natural gas or propane * At least 50% of the non-diesel engine combustion sources in operation at the PLU utilize emissions control for NOx emissions.   **For Ozone nonattainment areas:** At minimum one of the following must be met:   * At least 75% of the normal annual fuel usage for non-diesel engine combustion sources in operation at the PLU is either natural gas or propane * At least 75% of the non-diesel engine combustion sources in operation at the PLU utilize emissions control for NOx emissions. |
| High risk combustion sources | 1 | **For Ozone attainment areas:** At minimum one of the following must be met:   * Less than 50% of the normal annual fuel usage for non-diesel engine combustion sources in operation at the PLU is either natural gas or propane * Less than 50% of the non-diesel engine combustion sources in operation at the PLU utilize emissions control for NOx emissions.   **For Ozone nonattainment areas:**   * Less than 75% of the normal annual fuel usage for non-diesel engine combustion sources in operation at the PLU is either natural gas or propane * Less than 75% of the non-diesel engine combustion sources in operation at the PLU utilize emissions control for NOx emissions. |

### Component 3: Ozone – open burning

**Description:** Emissions of ozone precursors from fire do not excessively contribute to negative impacts to human, plant, or animal health.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Pasture, Range**

A threshold value of 50 will be set, and the existing condition questions will be triggered:

Table 135*: Are you using fire for management?*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable – Fire is not used for management on the PLU | 100 |
| Fire is used for management on the PLU, and basic smoke management practices ARE implemented | 51 |
| –Fire is used for management on the PLU, and basic smoke management practices are NOT implemented | 1 |

If less than 100% of all fire events at the PLU are conducted using Basic Smoke Management Practices, apply Prescribed Burning (338) to develop, implement, and follow a prescribed burn plan that includes Basic Smoke Management Practices for all fire events. Additional practices may be necessary to support Prescribed Burning (338).

### Component 4: Ozone – pesticides

**Description:** Emissions of VOCs from pesticide use do not excessively contribute to negative impacts to human, plant or animal health.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Pasture, Range**

Each PLU will trigger an intersection with the Ozone nonattainment maps. If the PLU is not within a nonattainment or maintenance area for Ozone, this component is not applicable. If the PLU is within a nonattainment or maintenance area for Ozone, the threshold value will depend on the nonattainment or maintenance status as seen in Table 136*: Ozone Pesticide Application Threshold Values*. The threshold value will apply to cover both fumigant and non-fumigant pesticide requirements.

Table 136*: Ozone Pesticide Application Threshold Values*

|  |  |
| --- | --- |
| Ozone Nonattainment Status | Threshold Value |
| Extreme nonattainment | 90 |
| Severe nonattainment | 80 |
| Serious nonattainment | 70 |
| Moderate nonattainment | 60 |
| Maintenance or marginal nonattainment | 51 |

The existing condition questions will set the existing condition score as seen in the table below.

Table 137: *Integrated Pest Management – IPM System for Air Quality Impacts*

Note: What kind of Integrated Pest Management (IPM) System is implemented on the PLU to manage pests and pesticide environmental risk?

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Pest Management Conservation System (Code 595) - Full IPM System for Efficient Production and Environmental Protection | 91 | A full IPM System is utilized including Prevention, Avoidance, Monitoring, and Suppression to manage pests (including invasive plants) to meet production needs and manage pesticide environmental risk, including Windows Pesticide Screening Tool results for risks to water quality. If this answer is selected, do NOT select Practice code 595 on the Existing or Planned Practices pages so as not to double count points. |
| Full IPM System for Efficient Production | 51 | A full IPM System is utilized including Prevention, Avoidance, Monitoring, and Suppression to manage pests (including invasive plants) to meet production needs. |
| No IPM System, but pesticides are used to manage pests. | 1 | An IPM System is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs. |
| No IPM System, but pesticides are used to manage pests and spray drift is minimized. | 1 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs, and pesticide drift is minimized with drift reducing spray technologies. |
| No IPM System, but pesticides are used to manage pests and the development of pest resistance is carefully managed. | 1 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to address production needs and the development of pest resistance is carefully managed. |
| No IPM System, but pesticides are used to manage pests, the development of pest resistance is carefully managed, and spray drift is minimized. | 1 | An IPM system is not utilized, but pesticides are applied according to label guidance to manage pests (including invasive plants) to address production needs, the development of pest resistance is carefully managed, and pesticide drift is minimized with drift reducing spray technologies. |
| No pesticides are used to manage pests. | 51 | Pests (including invasive plants) are managed to meet production needs without the use of pesticides. |
| No pesticides are used because pests are not managed. | 51 | Pests (including Invasive plants) are not managed (no pesticides are used) so production may be reduced beyond tolerable limits. |

### Component 5: Ozone – confined animal activities

**Description:** Emissions of VOCs from confinement-based livestock production do not excessively contribute to negative impacts to human, plant or animal health.

**Analysis within CART:**

**Farmstead**

Each PLU will trigger an intersection with the Ozone nonattainment maps. If the PLU is not within a nonattainment or maintenance area for Ozone, this component is not applicable. If the PLU is within a nonattainment or maintenance area for Ozone, each PLU for the Farmstead land use will default to a not assessed status for this component. The Planner may identify an Ozone resource concern for this component based on site specific conditions. A threshold value will be set at 50.

If there is no confinement-based livestock production at the PLU, this component is not applicable. The existing condition questions will set the existing condition score as seen in Table 138.

Table 138*: Manures or compost stockpiled or stored on the PLU with potential Air Quality Impacts*

*Question hover text: Associated with confined animal activities.*

Note: Are they stockpiled or stored on the PLU?

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 100 |
| Only solid material storage - contained | 51 |
| Only solid material storage - not contained | 51 |
| Liquid or mixed manure storage - contained | 31 |
| Liquid or mixed manure storage – contained, aerobic or covered | 51 |
| Liquid or mixed manure storage - not contained | 1 |

If an Ozone resource concern is determined to exist for VOC emissions from confinement-based animal production for this component, Conservation Practices and Activities related to reducing VOC emissions from confinement‑based livestock or poultry production are determined based on an alternative scenario analysis of the PLU using the National Air Quality Site Assessment Tool (NAQSAT – [http://naqsat.tamu.edu](http://naqsat.tamu.edu/)) and the USDA/EPA Agricultural Air Quality Conservation Measures Guide for Poultry and Livestock Production and are added to the benchmark condition to determine the state of the planned management system.

## **Objectionable Odors (Odor)**

### Component 1: Odor – nitrogen fertilizer

**Description:** Emissions of odorous compounds (VOCs, ammonia and odorous sulfur compounds) can cause nuisance conditions.

**Objective:** Emissions of ammonia from nitrogen fertilizer application do not excessively contribute to negative odor impacts.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Forest, Pasture**

The Planner may identify an Odor resource concern for this component based on site specific conditions. A threshold value will be set at 50.

The existing condition question will set the existing condition score as seen in Table 139.

Table 139*: Nutrient Application – Nitrogen impacts to Air Quality*

*Question hover text: Includes organic and inorganic nutrients applied mechanically or by hand. Does NOT include nutrients deposited by grazing animals when these are the only nutrients applied.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| No nutrients applied | 51 | No organic or inorganic nutrients are applied mechanically or by hand OR planner did not observe any odor concerns in field visit AND no known complaints of odor from neighbors. Note that this does not include nutrients deposited by grazing animals when these are the only nutrients applied to the PLU. |
| Nutrients are applied | 1 | Organic or inorganic nutrients are applied to the PLU mechanically or by hand. |

If there is no NRCS-approved nutrient management plan that specifically addresses nitrogen for the PLU, apply Nutrient Management (590) to develop such a plan.

### Component 2: Odor – confined animal activities

**Description:** Emissions of volatile organic compounds (VOCs), ammonia, and odorous sulfur compounds from confinement-based animal production do not excessively contribute to negative odor impacts.

**Analysis within CART:**

**Farmstead**

The Planner may identify an Odor resource concern for this component based on site specific conditions. A threshold value of 50 will be set.

If there is no confinement-based livestock production at the PLU, this component is not applicable. The existing condition questions will set the existing condition score as seen in Table 140.

Table 140*: Odor from Confined Animal Activities*

*Question hover text: Has the client or planner observed any odor issues related to confinement-based animal production at the PLU, and have any practices or techniques been previously applied to address the observed odor issues?*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Not Applicable | 100 | No odor issues related to confinement-based animal production at the PLU |
| Minimal potential for odor | 51 | Neither the Planner or client has observed any odor issues related to confinement-based animal production at the PLU |
| Significant potential for odor | 1 | Planner or client has observed odor issues related to confinement-based animal production at the PLU |

Conservation Practices and Activities related to reducing odor emissions from confinement-based livestock production are determined based on an analysis of the PLU using the National Air Quality Site Assessment Tool (NAQSAT – [http://naqsat.tamu.edu](http://naqsat.tamu.edu/)) and the USDA/EPA Agricultural Air Quality Conservation Measures Guide for Poultry and Livestock Production and are added to the existing condition to determine the state of the planned management system.

## **Emissions of Airborne Reactive Nitrogen (Airborne Nitrogen)**

### Component 1: Reactive nitrogen – diesel engines

**Description:** Emissions of airborne reactive nitrogen from diesel engines do not excessively contribute to negative atmospheric and/or ecosystem impacts.

**Objective:** Emissions of airborne reactive nitrogen from diesel engines do not excessively contribute to negative impacts to human, plant or animal health.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Pasture, Range**

A threshold value of 50 will be set, and the existing condition question will be triggered.

The existing condition question will set the existing condition score as seen in Table 141.

Table 141*: Diesel Engine Combustion Sources Existing Condition*

*Question hover text. If there are no diesel engines in operation at the PLU, this component is not applicable. Otherwise, document all diesel engines larger than 25 brake horsepower, including engine horsepower rating, model year, and annual hours of usage.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Not applicable | 100 |  |
| Low risk combustion sources | 81 | All diesel engines larger than 25 brake horsepower in operation at the PLU are certified to EPA Tier 4 final standards (based on engine model year and horsepower rating). See Appendix D for an EPA Tier chart. |
| Medium risk combustion sources | 51 | All diesel engines larger than 25 brake horsepower in operation at the PLU are certified to at least EPA Tier 3 standards (based on engine model year and horsepower rating). See Appendix D for an EPA Tier chart. |
| High risk combustion sources | 1 | Not all diesel engines larger than 25 brake horsepower in operation at the PLU are certified to at least EPA Tier 3 standards (based on engine model year and horsepower rating). See Appendix D for an EPA Tier chart. |

### Component 2: Reactive nitrogen – non-engine combustion equipment

**Description:** Emissions of airborne reactive nitrogen from non-diesel engine combustion sources do not excessively contribute to negative atmospheric and/or ecosystem impacts.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Pasture, Range**

A threshold value of 50 will be set.

The existing condition question will set the existing condition score as seen in Table 142.

Table 142*: Non-Engine Combustion Sources Existing Condition*

*Question hover text: If there are no non-engine combustion sources in operation at the PLU, this component is not applicable. Otherwise, document all non-engine combustion sources, including heat input rating, fuel type, and annual hours of usage.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Not applicable | 100 |  |
| Low risk combustion sources | 81 | At minimum one of the following must be met:   * All non-diesel engine combustion sources utilize natural gas or propane as fuel * Other emissions control for PM and NOx emissions are employed for all non-diesel engine combustion sources |
| Medium risk combustion sources | 51 | At minimum one of the following must be met:   * At least 50% of the normal annual fuel usage for non-diesel engine combustion sources in operation at the PLU is either natural gas or propane * At least 50% of the non-diesel engine combustion sources in operation at the PLU utilize emissions control for NOx emissions. |
| High risk combustion sources | 1 | At minimum one of the following must be met:   * Less than 50% of the normal annual fuel usage for non-diesel engine combustion sources in operation at the PLU is either natural gas or propane * Less than 50% of the non-diesel engine combustion sources in operation at the PLU utilize emissions control for NOx emissions. |

### Component 3: Reactive nitrogen – open burning

**Description:** Emissions of airborne reactive nitrogen (NH3 and NOx) can negatively impact atmospheric chemistry, cause unwanted fertilization via deposition in sensitive ecosystems, and degrade regional visibility.

**Objective:**  Emissions of airborne reactive nitrogen from fire do not excessively contribute to negative atmospheric and/or ecosystem impacts.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Farmstead, Forest, Pasture, Range**

A threshold value of 50 will be set, and the existing condition questions will be triggered.

Table 143*: Are you using fire for management?*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable – Fire is not used for management on the PLU | 100 |
| Fire is used for management on the PLU, and basic smoke management practices ARE implemented | 51 |
| –Fire is used for management on the PLU, and basic smoke management practices are NOT implemented | 1 |

If less than 100% of all fire events at the PLU are conducted using Basic Smoke Management Practices, apply Prescribed Burning (338) to develop, implement, and follow a prescribed burn plan that includes Basic Smoke Management Practices for all fire events. Additional practices may be necessary to support Prescribed Burning (338).

### Component 4: Reactive nitrogen – nitrogen fertilizer

**Description:** Emissions of airborne reactive nitrogen from nitrogen fertilizer application do not excessively contribute to negative atmospheric and/or ecosystem impacts.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Forest, Pasture**

The Planner may identify an Airborne Reactive Nitrogen resource concern for this component based on site specific conditions. A threshold value will be set at 50.

The existing condition question will set the existing condition score as seen in Table 144.

Table 144*: Nutrient Application – Nitrogen impacts to Air Quality*

*Question hover text: Includes organic and inorganic nutrients applied mechanically or by hand. Does NOT include nutrients deposited by grazing animals when these are the only nutrients applied.*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| No nutrients applied | 51 | No organic or inorganic nutrients are applied mechanically or by hand. Note that this does not include nutrients deposited by grazing animals when these are the only nutrients applied to the PLU. |
| Nutrients are applied | 1 | Organic or inorganic nutrients are applied to the PLU mechanically or by hand. |

If there is no NRCS-approved nutrient management plan that specifically addresses nitrogen for the PLU, apply Nutrient Management (590) to develop such a plan.

### Component 5: Reactive nitrogen – confined animal activities

**Description:** Emissions of airborne reactive nitrogen from confinement-based animal production do not excessively contribute to negative atmospheric and/or ecosystem impacts.

**Analysis within CART:**

**Farmstead**

The Planner may identify a Reactive Nitrogen concern for this component based on site specific conditions. A threshold value will be set at 50.

If there is no confinement-based livestock production at the PLU, this component is not applicable. The existing condition questions will set the existing condition score.

Table 145: *Manures or compost stockpiled or stored on the PLU with potential Air Quality Impacts*

*Question hover text: Associated with confined animal activities.*

Note: Are they stockpiled or stored on the PLU?

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Not applicable | 100 |
| Only solid material storage - contained | 11 |
| Only solid material storage - not contained | 1 |
| Liquid or mixed manure storage - contained | 11 |
| Liquid or mixed manure storage – contained, aerobic or covered | 21 |
| Liquid or mixed manure storage - not contained | 1 |

If an Airborne Reactive Nitrogen resource concern is determined to exist based on this analysis of the PLU, Conservation Practices and Activities related to reducing ammonia emissions from confinement-based livestock or poultry production are determined based on an alternative scenario analysis of the PLU using the National Air Quality Site Assessment Tool (NAQSAT – [http://naqsat.tamu.edu](http://naqsat.tamu.edu/)) and the USDA/EPA Agricultural Air Quality Conservation Measures Guide for Poultry and Livestock Production and are added to the benchmark condition to determine the state of the planned management system.

Table 146*: Feed Management Plan or Strategy to Manage Nitrogen Excretion*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Score | Reference for Assessment Condition |
| Feed management plan or strategy to manage nitrogen excretion | 40 | The client can certify that a feed management plan or strategy is in place to manage nitrogen excretion. |
| No feed management plan or strategy to manage nitrogen excretion | 1 | A feed management plan or strategy to manage nitrogen excretion is not being implemented at the PLU. |

# **Plants**

## **Plant Productivity and Health**

### Component: Plant productivity and health

**Description:** Improper fertility, management, or plants not adapted to site negatively impact plant productivity, vigor, quality, or some combination of these.

**Objective:** Improve poor plant productivity and health.

**Analysis within CART:**

The planner will identify this resource concern based on site-specific conditions using technically completed land health and management assessment methods.

**Associated Agriculture Land, Developed Land, Farmstead, Other Rural Land**

Each PLU will have a threshold value of 50 set and a benchmark condition set of questions as identified in Table 147: .

Table 147: Plant Productivity and Health

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| High | 50 | No significant plant productivity or health related concern exists on this PLU |
| Good | 30 | Some productivity or plant health concerns exist |
| Poor | 0 | Severe lack of health and productivity for plants in the PLU |

**Crop**

Each PLU for crop will have a threshold value of 50 set and a benchmark condition set of questions. The existing condition questions will set the existing score as identified below in

Table 148 and Table 149*:*

Table 148*: Crop Plant Productivity*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| High | 51 | 100% of potential Crop yield based on soil, climate, and fertility (10 yr. avg. or county avg.) |
| Good | 40 | >75% of potential Crop yield based on soil, climate, and fertility (10 yr. avg.) |
| Fair | 10 | >50% of potential Crop yield based on soil, climate, and fertility (10 yr. avg.) |
| Low | 5 | >20% of potential Crop yield based on soil, climate, and fertility (10 yr. avg.) |
| Poor | 1 | ≤20% of potential Crop yield based on soil, climate, and fertility (10 yr. avg.) |

Table 149*: Crop Plant Health*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Plants are healthy | 30 |
| Evidence of nutrient deficiency is minimal | 20 |
| Evidence of both nutrient deficiency and disease | 5 |
| Evidence of plant health damage | 1 |

**Forest**

Each PLU for Forest will have a threshold value of 50 set and a benchmark condition set of questions as identified in Table 150: and if needed, Table 151,

Table 152, and Table 153.

Table 150: Current condition of the client’s Forest Management Plan that addresses plant productivity and health

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| Plan is actively being followed AND all current practices have been implemented that will improve plant productivity and health | 51 | If selected, stop because the Existing Condition has been established. NOTE: When this answer has been selected, do NOT select Forest Management Plan (FMP) on the Existing or Planned Practices pages so as not to double count points for having an FMP. |
| Plan is actively being followed BUT there are still current practices to be implemented that will improve plant productivity and health | 15 | If selected, the below assessment questions will become active. Complete the assessment questions for this RC below. |
| Plan exists but is not being actively followed | 0 | If selected, the below assessment questions will become active. Complete the assessment questions for this RC below. |
| No Plan Exists | 0 | If selected, the below assessment questions will become active. Complete the assessment questions for this RC below. |

If either of the last three answer options above are selected, the following questions will become active in CART for the planner to answer.

Table 151*: Managed tree species are native, and best suited for sustainability on the site and commensurate with client’s objectives*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| Yes | 25 |  |
| No | 0 |  |

Table 152*: Stocking levels are appropriate for the site and commensurate with client’s objectives*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| Yes | 20 |  |
| No | 0 |  |

Table 153*: Tree Vigor within stand or management unit*

Note: What is the proportion of dead and dying trees on the site?

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| None to Slight (<10%) | 20 |  |
| Slight to Moderate (10-20%) | 15 |  |
| Moderate (21-40%) | 10 |  |
| Moderate to Extreme (41-60%) | 5 |  |
| Extreme (>60%) | 0 |  |

**Pasture**

Each PLU for Pasture will have a threshold value of 50 set and a benchmark condition set of questions in

Table 154, Table 155, and Table 156.

Table 154*: Pasture - Percent Desirable Plants*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| High | 25 | * Desirable species > 80% of stand by air dry weight production. * Pasture Condition Score element score = 5 |
| Good | 20 | * Desirable Species 61-80% of stand by air dry weight production. * Pasture Condition Score element score = 4 |
| Fair | 17 | * Desirable Species 41-60% of stand by air dry weight production. * Pasture Condition Score element score = 3 |
| Low | 8 | * Desirable species 20 – 40% of stand by air dry weight production. * Pasture Condition Score element score = 2 |
| Poor | 1 | * Desirable species <20% of stand by air dry weight production. * Pasture Condition Score element score = 1 |

Table 155*: Pasture –Plant Cover*

*Question hover text: Pasture Condition Score Live or Dormant Plant Cover*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| High | 20 | * More than 95% live (non-dormant) leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 5 |
| Good | 17 | * 81-95% live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 4 |
| Fair | 10 | * 66-80% live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 3 |
| Low | 5 | * 40-65% is live leaf canopy Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 2 |
| Poor | 1 | * Less than 40% is live leaf canopy. Remaining is either dead standing material, or bare ground. * Pasture Condition Score element score = 1 |

Table 156*: Pasture - Plant Vigor*

*Question hover text: Established using Pasture Condition Score Sheet for Plant Vigor OR determining Indicators of Pasture Health (DIPH) for Plant Vigor*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| High | 20 | * Rapid recovery of desirable forage. All healthy green forage. * Pasture Condition Score element score = 5   OR   * Determining Indicator of Pasture Health - Biotic Integrity Attribute is None to Slight departure |
| Good | 17 | * Good recovery of desirable forage. Light green and dark green forage present. * Pasture Condition Score element score = 4 * Or * Determining Indicators of Pasture Health - Biotic Integrity Attribute is Slight to Moderate departure |
| Fair | 10 | * Adequate recovery of desirable forage. Yellowish and dark green areas due to manure and urine patches. * Pasture Condition Score element score = 3   OR   * Determining Indicators of Pasture Health – Biotic Integrity Attribute is Moderate departure |
| Low | 5 | * Some recovery. Yellowish green forage, or moderately or sight stunting of desirable forage. * Pasture Condition Score element score = 2   Or   * Determining Indicators of Pasture Health – Biotic Integrity is Moderate to Extreme departure |
| Poor | 1 | * No plant recovery after grazing/harvest. Pale, yellow or brown, or severe stunting of desirable forage. * Pasture Condition Score element score = 1   OR   * Determining Indicators of Pasture Health – Biotic Integrity is Extreme to Total departure |

**Range**

Each PLU for Range will have a threshold value of 50 set and the benchmark condition question will be triggered as seen in Table 157.

Table 157*: Rangeland Health – Biotic Integrity Attribute*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| None to Slight | 60 | Interpreting Indicators of Rangeland Health (most current version) |
| Slight to Moderate | 51 | Interpreting Indicators of Rangeland Health (most current version) |
| Moderate | 30 | Interpreting Indicators of Rangeland Health (most current version) |
| Moderate to Extreme | 15 | Interpreting Indicators of Rangeland Health (most current version) |
| Extreme | 1 | Interpreting Indicators of Rangeland Health (most current version) |

## **Plant Structure and Composition**

### Component: Plant structure and composition

**Description:** Plant communities have insufficient composition and structure to achieve ecological functions and management objectives. This includes degradation of wetland habitat, targeted ecosystems, or unique plant communities.

**Objective:** Improve plant structure and composition.

**Analysis within CART:**

The planner will identify this resource concern based on site-specific conditions using technically completed land health and management assessment methods. The threshold and existing condition questions will set the existing score by land use as identified below.

**Forest**

Each PLU for Forest will have a threshold value of 50 set and a benchmark condition question.

Table 158: *Forest Community Quality*

*Question hover text: What proportion of the stand has the expected density, composition, and age structure that demonstrates the representative plant community?*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| >80% of stand | 51 | Compare stand condition with expected density, composition, and age structure that demonstrates the representative plant community. Compare stand condition with Conservation Tree/Shrub Groups (CTSG), Ecological Site Descriptions (ESD), or other local information. |
| 61-80% of stand | 35 | Compare stand condition with expected density, composition, and age structure that demonstrates the representative plant community. Compare stand condition with Conservation Tree/Shrub Groups (CTSG), Ecological Site Descriptions (ESD), or other local information. |
| 41-60% of stand | 20 | Compare stand condition with expected density, composition, and age structure that demonstrates the representative plant community. Compare stand condition with Conservation Tree/Shrub Groups (CTSG), Ecological Site Descriptions (ESD), or other local information. |
| 20-40% of stand | 10 | Compare stand condition with expected density, composition, and age structure that demonstrates the representative plant community. Compare stand condition with Conservation Tree/Shrub Groups (CTSG), Ecological Site Descriptions (ESD), or other local information. |
| <20% of stand | 1 | Compare stand condition with expected density, composition, and age structure that demonstrates the representative plant community. Compare stand condition with Conservation Tree/Shrub Groups (CTSG), Ecological Site Descriptions (ESD), or other local information. |

**Pasture**

Each PLU for pasture will have a threshold value of 50 set and a benchmark condition set of questions.

Table 159: Pasture – Percent Desirable Plants

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| High | 30 | * Desirable species >80% of stand by air dry weight production. * Pasture Condition Score element score = 5 |
| Good | 26 | * Desirable Species 61-80% of stand by air dry weight production. * Pasture Condition Score element score = 4 |
| Fair | 17 | * Desirable Species 41-60% of stand by air dry weight production. * Pasture Condition Score element score = 3 |
| Low | 8 | * Desirable species 20 – 40% of stand by air dry weight production. * Pasture Condition Score element score = 2 |
| Poor | 1 | * Desirable species <20% of stand by air dry weight production. * Pasture Condition Score element score = 1 |

*Table 160: Pasture - Plant Vigor*

*Question hover text: Established using Pasture Condition Score Sheet for Plant Vigor OR determining Indicators of Pasture Health (DIPH) for Plant Vigor*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| High | 30 | * Rapid recovery of desirable forage. All healthy green forage. * Pasture Condition Score element score = 5   OR   * Determining Indicator of Pasture Health - Biotic Integrity Attribute is None to Slight departure |
| Good | 26 | * Good recovery of desirable forage. Light green and dark green forage present. * Pasture Condition Score element score = 4 * Or * Determining Indicators of Pasture Health - Biotic Integrity Attribute is Slight to Moderate departure |
| Fair | 17 | * Adequate recovery of desirable forage. Yellowish and dark green areas due to manure and urine patches. * Pasture Condition Score element score = 3   OR   * Determining Indicators of Pasture Health – Biotic Integrity Attribute is Moderate departure |
| Low | 8 | * Some recovery. Yellowish green forage, or moderately or sight stunting of desirable forage. * Pasture Condition Score element score = 2   Or   * Determining Indicators of Pasture Health – Biotic Integrity is Moderate to Extreme departure |
| Poor | 1 | * No plant recovery after grazing/harvest. Pale, yellow or brown, or severe stunting of desirable forage. * Pasture Condition Score element score = 1   OR   * Determining Indicators of Pasture Health – Biotic Integrity is Extreme to Total departure |

**Range**

Each PLU for range will have a threshold value of 50 set and a benchmark condition question.

Table 161: Rangeland Health - Biotic Integrity

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for assessment condition |
| None to Slight | 60 | Interpreting Indicators of Rangeland Health (most current version) AND Functional/Structural indicator 12 is None to Slight departure |
| Slight to Moderate | 51 | Interpreting Indicators of Rangeland Health (most current version) AND Functional/Structural indicator 12 is Slight to Moderate departure |
| Moderate | 20 | Interpreting Indicators of Rangeland Health (most current version) AND Functional/Structural indicator 12 is Moderate departure |
| Moderate to Extreme | 10 | Interpreting Indicators of Rangeland Health (most current version) AND Functional/Structural indicator 12 is Moderate to Extreme departure |
| Extreme | 1 | Interpreting Indicators of Rangeland Health (most current version) AND Functional/Structural indicator 12 is Extreme departure |

## **Plant Pest Pressure**

### Components: Plant pest pressure, chemical resistance, and invasive species

**Description:** Excessive pest damage to plants including that from undesirable plants, diseases, animals, soil borne pathogens, and nematodes.

**Objective:** Reduce plant pest pressure.

**Analysis within CART:**

Plant pest pressure, chemical resistance, and invasive species: **Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water**

The planner will identify this resource concern based on site-specific conditions using technically completed land health and management assessment tools. A threshold value of 50 will be set and existing condition question will be triggered. The existing condition question will set the existing score.

**Note: NRCS policy may exclude funding options on crops**

Table 162: Plant Pest Pressure

*Question hover text: Plant pest pressure existing condition related to pest management.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Answer | Pest Pressure Existing Condition Points | Chemical Resistance Existing Condition Points | Invasive Species Existing Condition Points | Reference for Assessment Condition |
| Pest Management Conservation System (Code 595) - Full IPM System for Efficient Production and Environmental Protection | 51 | 51 | 51 | A full IPM System is utilized including Prevention, Avoidance, Monitoring, and Suppression to manage pests (including invasive plants) to meet production needs and manage pesticide environmental risk. If this answer is selected, do NOT select Practice code 595 on the Existing or Planned Practices pages so as not to double count points. |
| Pest Management system utilizes only non-chemical strategies | 51 | 51 | 51 | Pests (including invasive plants) are managed to meet production needs without the use of pesticides. Tillage may be a primary pest management strategy. |
| Pest Management Conservation System (Code 595) – IPM System for efficient production utilizing PAMS strategies. | 40 | 40 | 40 | An IPM System is utilized including Prevention, Avoidance, Monitoring, and Suppression to manage pests (including invasive plants) to meet production needs. |
| Pesticides are used to manage pests and specific and deliberate management strategies are used to ensure that spray drift is minimized beyond label requirements | 15 | 1 | 15 | Pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs, and pesticide drift is minimized with drift reducing technologies. |
| Pesticide application is the primary strategy used to manage pests | 1 | 0 | 1 | Pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs. Pest resistance and drift are not deliberately managed and control measures are minimally documented |

## **Wildfire Hazard from Biomass Accumulation**

### Component: Wildfire hazard from biomass accumulation

**Description:** The kinds and amounts of plant green or dead biomass creates wildfire hazards that pose risks to human safety, structures, plants, animals, soil and air resources.

**Objective:** Reduce biomass accumulation and the risk of wildfire hazard.

**Analysis within CART:**

The planner will identify this resource concern based on site-specific conditions using technically completed land health and management assessment methods. A threshold value of 50 will be set and existing condition questions will be triggered. The existing condition questions will set the existing score as seen in Table 163: Table 164: and Table 165.

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Other Rural Land, Pasture, Range, Undetermined**

Table 163: Risk and Hazard of Wildfire (within All Land Uses Except Forest)

*Question hover text: The kinds and amounts of plant green or dead biomass creates wildfire hazards that pose risks to human safety, structures, plants, animals, soil, and air resources.*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Accumulation of plant biomass is being managed to reduce the potential risk of wildfire | 51 |
| The potential for wildfire hazard from biomass accumulation exists, but site resources are not at a risk or value level to require fire management | 51 |
| The potential for wildfire hazard from biomass accumulation exists | 30 |
| Significant wildfire hazard from biomass accumulation exists | 1 |

**Forest**

Table 164: Forest Wildfire Hazard Potential

Question hover text: Forest Wildfire Hazard Potential on the site (LANDFIRE, USFS, or other local wildfire hazard database)

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Very Low | 25 |
| Low | 20 |
| Moderate | 10 |
| High | 5 |
| Very High | 0 |

Table 165: Percentage of the site that has forest conditions that will support the ignition and propagation of an active wildfire

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| <10% of Stand | 35 |
| 10-20% of Stand | 30 |
| 21-50% of Stand | 15 |
| 51-70% of Stand | 5 |
| >70% of stand | 0 |

# **Animals**

## **Terrestrial Habitat for Wildlife and Invertebrates**

### Component: Terrestrial habitat for wildlife and invertebrates

**Description:** Quantity, quality or connectivity of food, cover, space, and/or water is inadequate to meet requirements of identified terrestrial wildlife or invertebrate species.

**Objective:** Improve quantity and quality of food, water, cover or shelter, habitat continuity, or some combination of these for terrestrial wildlife or invertebrate species.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined, Water**

The planner may identify this resource concern based on site-specific conditions, client input, or both. A threshold value of 50 will be set. This value is equivalent to the Wildlife Habitat Evaluation Guide (WHEG) assessment threshold of 0.5 on a 0 to 1 scale (CART uses a 0-100 point scale). The existing condition question will set the existing condition points.

The planner will first select the Assessment method used to evaluate terrestrial habitat conditions on the PLU.

In the future, each PLU with an attributed land use will trigger a web service to determine if the PLU is located within a priority terrestrial habitat area (e.g., Working Lands for Wildlife, Threatened/Endangered Species range and/or critical habitat (USFWS ECOS), NatureServe National Species Dataset).

Table 166: Assessment Method

|  |  |
| --- | --- |
| Answer | Description/comments |
| Working Lands for Wildlife Guide or State Wildlife Guide | Go to Terrestrial Habitat Existing Condition |
| National Land Use Assessment | Go to Preliminary Terrestrial Habitat Assessment Questions by Land Use below |

NOTE: If a State developed WHEG or other external assessment developed by a State is used to assess habitat, then preliminary assessment land use questions are bypassed (i.e., they don't need to be answered), and the corresponding answer for Terrestrial Habitat Existing Condition should be selected for the external assessment.

Table 167: Terrestrial Habitat Existing Condition

|  |  |  |
| --- | --- | --- |
| Answer | Description/comments | Existing Condition Points |
| Excellent | Habitat quality is defined as *excellent* for the priority species. WHEG range 0.7 to 1.0 | 70 |
| Good | Habitat quality is defined as *good* for the priority species. WHEG range 0.5 to <0.7 | 50 |
| Fair | Habitat quality is defined as *fair* for the priority species. WHEG range 0.3 to <0.5 | 30 |
| Poor | Habitat quality is defined as *poor* for the priority species. WHEG range 0.1 to <0.3 | 10 |
| Absent | Habitat for the priority species is absent or of such low quality to be effectively absent. | 1 |

**Preliminary Terrestrial Habitat Assessment Questions by Land use**

These preliminary land use assessments can be used if a State WHEG or other state approved wildlife evaluation is not used. For questions related to terminology or applicability to your State pertaining to these preliminary land use assessments, please see your State supplemental guidance.

Table 168: *Crop (Annual and Mixed) + (Perennial) Preliminary Assessment Questions and Answer Choices*

|  |  |  |
| --- | --- | --- |
| Question | Crop (Annual and Mixed) + (Perennial) Preliminary Assessment Questions and Answer Choices | Existing Condition Points |
|  | Is the cropland flooded annually (or as approved by State) to provide habitat for wetland wildlife, target wildlife species, or both?  Instructions: If cropland is to be flooded by natural precipitation, it must have >60% probability of flooding. Critical months of flooding are determined by State Biologist. |  |
| a. Yes |  |
| b. No |  |
| If Yes to Question #1, continue below | | |
|  | Is surface water present sufficient in duration and depth for target wildlife species?  Instructions: Calculate by considering consecutive days of planned surface water present.  Dependable artificial water must guarantee water for the time period indicated. Natural precipitation must have >60% probability of flooding, otherwise select No for Question #1. Critical months of flooding are determined by State Biologist. |  |
| 1. Yes | 33 |
| 1. No | 0 |
|  | What is the frequency of the flooding or inundation? |  |
| 1. <2 out of 3 years. | 7 |
| 1. 2 out of 3 years with dependable artificial water or precipitation driven flooding on C or D soils. | 17 |
| 1. Annually with dependable artificial water or precipitation driven flooding on C or D soils. | 33 |
|  | What is the size of the flooded area or inundation? |  |
| 1. ≤33% of the field. | 7 |
| 1. >33 and ≤50% of the field. | 17 |
| 1. >50 and ≤75% of the field. | 27 |
| 1. >75% of the field. | 34 |
| If No to Question #1, continue below | | |
|  | What is the composition of Non-Cropland Habitat Elements (NCHE)?  Instructions: NCHE are habitat elements associated with crop fields, such as field borders, odd areas, windbreaks, wetlands, brushy draws, hedgerows, seeps, riparian areas, vegetated ditches, native vegetated communities, rare and declining habitats, and center pivot corners, occurring within the field or directly adjacent to the cropland field, such as CRP, woodlands, and riparian areas. Eligible NCHE must be under the control of the applicant and ≥30 feet wide and ≥0.1 acre. NCHE must meet the wildlife habitat standards as defined by the State Biologist. Undesirable plant species are already defined by States. For this question, undesirable plant species are considered with respect to the target wildlife species for management and not necessarily with respect to the producer. |  |
| Herbaceous cover with >75% undesirable species OR NCHE not applicable (N/A) to PLU. | 0 |
| Herbaceous cover > 50% of introduced species with low wildlife value. | 2 |
| Cover composed > 50% of native plants; some structural or functional groups (e.g., warm-season grasses, cool-season, perennial forbs, shrubs, and trees) expected for the site are missing; number of species are fewer than expected for the ecological site or site potential. | 6 |
| Herbaceous cover either native herbaceous vegetation or introduced species with high wildlife value, such as those often included in wildlife seed mixes. | 8 |
| Cover is composed of >75% of all structural or functional groups (e.g., warm-season grasses, cool-season grasses, perennial forbs, shrubs, and trees) expected for the site; number of species in each group closely matches that expected for the ecological site or site potential (e.g., in the Ecological Site Description, if available, or plant composition description from the appropriate WHEG.). | 11 |
|  | What amount of NCHE, relative to the total size of the field, is within or directly adjacent to the field?  Instructions: Each of these elements must be wildlife friendly as determined by the State Biologist. Eligible NCHE must be under the control of the applicant and ≥30 feet wide and ≥0.1 acre.  NCHE must meet the wildlife habitat standards as defined by the State Biologist with guidance from the State wildlife agency.  Calculation:  Within field  Adjacent to field |  |
| 1. ≤1% of the field OR NCHE not applicable (N/A) to PLU. | 0 |
| 1. >1% and ≤5% of the field. | 3 |
| 1. >5% and ≤10% of the field. | 9 |
| 1. >10% of the field. | 11 |
|  | What is the average width of NCHE within or directly adjacent to the field?  Instructions: Each of these elements must be wildlife friendly as determined by the State Biologist. Eligible NCHE must be under the control of the applicant and ≥30 feet wide and ≥0.1 acre.  NCHE must meet the wildlife habitat standards as defined by the State Biologist. |  |
| <30 feet wide OR NCHE not applicable (N/A) to PLU. | 0 |
| ≥30 to and ≤75 feet wide. | 6 |
| >75 to and ≤120 feet wide. | 9 |
| >120 feet wide. | 11 |
|  | For within field NCHE, what is the distance from the center of the NCHE, or best approximate for center, to the closest edge of the field?  For adjacent NCHE, what is the distance from the center of the field, or best approximate for the center, to the closest edge of the NCHE?  Instructions: The distance can be estimated to either NCHE within the field or to NCHE in an adjacent field that is controlled by the applicant. |  |
| ≤330 feet OR NCHE not applicable (N/A) to PLU. | 11 |
| >330 feet and ≤660 feet. | 9 |
| >660 feet and ≤1320 feet. | 6 |
| >1320 feet and ≤2640 feet. | 2 |
| >2640 feet. | 0 |
|  | What is the crop rotation?  Instructions: Fallow = cropland rested during the growing season. States may modify with NTSC concurrence. |  |
| Continuous row or truck crops with little value for wildlife (e.g., soybeans). | 0 |
| Continuous small grain. | 2 |
| Row crop - small grain (e.g., corn-soybeans-wheat) | 3 |
| Rotation includes small grains **and** forage crops (i.e., alfalfa, clover, etc.) | 6 |
| Small grain - summer fallow (does not include fallow that involves cultivation practices that reduce cover, e.g., summer plowing) | 8 |
| Contour strip cropping (include small grains and hay **or** row crops, small grains, and hay) | 11 |
|  | Is a winter food source provided? |  |
| Fall tilled; no winter food | 0 |
| No fall tillage | 1 |
| ¼ to ≤1 acre of food plot or unharvested grain per 40 acres of cropland (minimum 30 feet wide and next to noncrop cover). | 3 |
| Winter food source is not a limiting factor for target wildlife species | 5 |
| >1 acre of food plot or unharvested grain per 40 acres of cropland (minimum 30 feet wide and next to noncrop cover). | 6 |
| Winter cover crop or hay/forage crop >50% and <75% of field. Crop height is adequate height for the target wildlife species. | 9 |
| Winter cover crop or hay/forage crop >75% of field. Crop height is adequate height for the target wildlife species. | 11 |
|  | What is the residue or stubble management for the over-winter condition?  Instructions: Select the condition most typical for your rotation.  Wheat-fallow rotations would select from a, b, f, or g. Crops that don't leave waste grain (cotton, peanuts, etc.) would select from a, b, c. Residue or stubble management must apply to at least 50% of the field. |  |
| Fall or winter tillage with <30% residue OR not applicable (N/A) to PLU. | 0 |
| Fall or winter tillage with ≥30% residue. | 1 |
| Undisturbed soybean residue or corn silage. | 2 |
| Stalks chopped or shredded, no soil disturbance or grasses or legumes in rotation. | 4 |
| Stalks gleaned by livestock, no mechanical disturbance. | 6 |
| Grain stubble or hay/forage crop left standing overwinter <8 inches. | 8 |
| Grain stubble or hay/forage crop left standing overwinter >8 inches. | 12 |
|  | If hay is part of crop rotation, what is the species composition of wildlife-unfriendly species?  Instructions: Wildlife friendly and unfriendly species are defined by the States. |  |
| Hay is not part of crop rotation. | 0 |
| Hayland composed of wildlife-unfriendly species. | 1 |
| Hayland composed of one or two wildlife-friendly species. | 3 |
| Hayland composed of three to five wildlife-friendly species. | 7 |
| Hayland composed of more than five wildlife-friendly species. | 11 |
|  | If hay is part of crop rotation, what is the harvest schedule?  Instructions: Nesting season or other critical wildlife periods are defined by States/State Biologists. Haying methods and patterns that consider wildlife needs include, but are not limited to: minimum mowing height, reduced cutting speed, flushing bars, mowing toward the outside of the field, wildlife exclusion areas, mow only during daylight. |  |
| Entire field cut during the nesting season or other critical wildlife period OR not applicable (N/A) to PLU. | 0 |
| Portions of the field cut before the nesting season or other critical wildlife period with some areas excluded for wildlife or haying methods and patterns considers wildlife needs. | 2 |
| >50% of hayland unharvested until end of nesting season or other critical wildlife period OR hay is harvested after 80% of the nesting season is concluded and haying methods and patterns used considers wildlife needs. | 6 |
| Hay cut not more than once per year and is cut before or after the nesting season or other critical wildlife period. Cuts before nesting season or other critical wildlife period must be far enough in advance to allow for sufficient regrowth for target wildlife species. Consult with State Biologist for adequate time windows for target wildlife species. | 8 |
| Hay cut before or after the nesting season or other critical wildlife period. Haying methods and patterns considers target wildlife species needs. Cuts before nesting season or other critical wildlife period must be far enough in advance to allow for sufficient regrowth for target wildlife species. Consult with State Biologist for adequate time windows for target wildlife species. | 11 |

Table 169: *Pasture Preliminary Assessment Questions and Answer Choices*

|  |  |  |
| --- | --- | --- |
| Question | Pasture Preliminary Assessment Questions and Answer Choices | Existing Condition Points |
|  | What is the species composition of the pasture?  Instructions: Pasture and Non-Pasture Habitat Elements (NPHE)- NPHE are habitat elements associated with pasture such as field borders, odd areas, windbreaks, wetlands, brushy draws, hedgerows, seeps, riparian areas, and center pivot corners that occur within the field. Or, NPHE that occurs directly adjacent to the pasture, such as CRP, woodlands, and riparian areas. Wildlife-friendly and unfriendly species are defined by the States. |  |
| 1. Composed of wildlife-unfriendly species OR NPHE not applicable (N/A) to PLU. | 0 |
| 1. Composed of wildlife-unfriendly grass with >33% legume cover. | 6 |
| 1. Composed of a mixture of one to three wildlife-friendly grasses and a legume. | 14 |
| 1. Composed of >3 wildlife-friendly grasses and legumes or forbs. | 20 |
|  | What is the grazing management at season of grazing?  Instructions: If managing for species of concern, consult with the State Biologist. Exceptions can be made to answer descriptions at discretion of State Biologist or designee. State Biologists determine nesting forage/stubble heights.  Light grazing (16-35% use): Key forage plants lightly to moderately used. Practically no use of low-value forage plants.  Moderate grazing (36-65% use): Key forage plants are used ≤ 50% for the season of grazing and the ecological site pasture state involved. Some use of low-value forage plants. All fully accessible areas are grazed; some trampling damage may be evident.  Heavy grazing (66-80% use): Key forage plants closely cropped. Low-value forage plants generally being grazed. Trampling damage is widespread in accessible areas. |  |
| All forage that is important for target wildlife species is closely grazed, livestock trails are numerous and trampling damage is widespread. | 0 |
| Light to moderate grazing over the entire grazed area with <20% of the grazed area meeting nesting/bloom period forage/stubble heights and conditions for target wildlife species during the nesting season or other critical wildlife periods as defined by the State Biologist. Little evidence of trails. | 6 |
| Light to moderate grazing with 20- 50% of grazed area meeting nesting/bloom period forage/stubble heights and conditions for target wildlife species during the nesting season or other critical wildlife periods as defined by the State Biologist. | 14 |
| Light to moderate grazing with greater than 50% of grazed area meeting nesting/bloom period forage/stubble heights and conditions for target wildlife species during the nesting season or other critical wildlife periods as defined by the State Biologist. | 20 |
|  | What is the species composition of NPHE within or directly adjacent to the field (e.g., not mowed, grazed, burned, sprayed, etc.) during nesting season or other critical wildlife periods?  Instructions: NPHE areas must be ≥30 feet wide and ≥0.1 acre in area.  NPHE includes pastures not grazed during the nesting season or other critical wildlife periods. NPHE must be under the control of the applicant and must meet wildlife habitat standards as defined by the State Biologist. |  |
| 1. Herbaceous or woody cover with >75% undesirable species OR NPHE not applicable (N/A) to PLU. | 0 |
| 1. Herbaceous or woody cover primarily of introduced species. | 3 |
| 1. Herbaceous or woody cover either native herbaceous vegetation or introduced species with high wildlife value, such as those often included in wildlife seed mixes. | 8 |
| 1. Cover composed primarily of native plants; some structural or functional groups (e.g., warm-season grasses, cool-season grasses, perennial forbs, shrubs, and trees) expected for the site are missing; number of species are fewer than expected for the ecological site. | 11 |
| 1. Cover is composed of all structural or functional groups (e.g., warm-season grasses, cool-season grasses, perennial forbs, shrubs, and trees) expected for the site; number of species in each group closely matches that expected for the ecological site. | 15 |
|  | What is the amount of NPHE, relative to the total size of the field, within or directly adjacent to the field?  Instructions: NPHE areas must be ≥30 feet wide and ≥0.1 acre in area. NPHE includes pastures not grazed during the nesting season or other critical wildlife period. NPHE must be under the control of the applicant and must meet wildlife habitat standards as defined by the State Biologist.  Calculation:  Within field  Adjacent to field |  |
| 1. ≤1% of the field OR NPHE not applicable (N/A) to PLU. | 0 |
| 1. >1 and ≤5% of the field. | 5 |
| 1. >5 and ≤10% of the field. | 12 |
| 1. >10% of the field. | 15 |
|  | What is the average width of NPHE within **or** directly adjacent to the field?  Instructions: NPHE areas must be ≥30 feet wide and ≥0.1 acre in area.  NPHE includes pastures not grazed during the nesting season or other critical wildlife period. NPHE must be under the control of the applicant and must meet wildlife habitat standards as defined by the State Biologist. |  |
| 1. <30 feet wide OR NPHE not applicable (N/A) to PLU. | 0 |
| 1. ≥30 to and ≤75 feet wide. | 5 |
| 1. >75 to and ≤120 feet wide. | 12 |
| 1. >120 feet wide. | 15 |
|  | For within field NPHE, what is the distance from the center of the NPHE, or best approximate for center, to the closest edge of the field?  For adjacent NPHE, what is the distance from the center of the field, or best approximate for the center, to the closest edge of the NPHE?  Instructions: The distance can be estimated to either NPHE within the field or to NPHE in a directly adjacent field that is controlled by the applicant. |  |
| 1. ≤330 feet OR NPHE not applicable (N/A) to PLU. | 15 |
| 1. >330 feet and ≤660 feet. | 12 |
| 1. >660 feet and ≤1320 feet. | 8 |
| 1. >1320 feet and ≤2640 feet. | 3 |
| 1. >2640 feet. | 0 |

Table 170: Range Preliminary Assessment Questions and Answer Choices

|  |  |  |
| --- | --- | --- |
| Question | Range Preliminary Assessment Questions and Answer Choices | Existing Condition Points |
|  | What is the species composition of the rangeland (i.e., Functional/Structural (F/S) Groups)?  Instructions: Plant group types (e.g., structural and functional groups) are suites or groups of plant species that are grouped together because they share similarities, such as shoot or root structure, photosynthetic pathways, nitrogen-fixing ability, life cycle, etc. Examples include cool-season grasses, warm-season grasses, annual grasses, perennial forbs, biennial forbs, annual forbs, shrubs, half-shrubs, deciduous trees, evergreen trees, cacti, yucca/yucca-like plants, succulent forbs, and leafy forbs (National Range and Pasture Handbook, p.3.1-13). Invasive or noxious species may not be used to represent a plant group type or structural type. Answer descriptions come from the current version of the Interpreting Indicators of Rangeland Health. If ESDs are not available, consult State specialist for alternative suitable plant community descriptions. |  |
| 1. All expected dominant F/S groups are now minor, trace or missing, F/S group(s) not expected, now dominant; the number of expected F/S groups and number of species within the groups severely reduced (missing ≥76%) [i.e., Extreme to Total Departure]. | 2 |
| 1. Dominant F/S group(s) has become minor or trace, or a minor or trace group is now dominant; a F/S group not expected is now subdominant; the number of F/S groups and the number of species within groups are greatly reduced (missing 51-75%) [i.e., Moderate to Extreme Departure]. | 5 |
| 1. Dominant F/S group has become subdominant; F/S group(s) not expected is now minor, the number of F/S groups and the number of species within groups are moderately reduced (missing 26-50%) [i.e, Moderate Departure]. | 15 |
| 1. Subdominant F/S has become minor or trace, or a trace F/S has become subdominant; F/S group not expected is now trace, the number of F/S groups and the number of species within the groups are slightly reduced (missing 10-25%) [i.e, Slight to Moderate or less departure]. | 20 |
|  | What is the grazing management at season of grazing?  Instructions: If managing for species of concern, consult with the State Biologist. Exceptions can be made to answer descriptions at discretion of State Biologist or designee.  Light grazing (≤35% use). Key forage plants lightly to moderately used at the end of the growing season. Use of low-value forage plants not evident. Moderate grazing (36-60% use): Key forage plants are used approximately 50% at the end of the grazing season with a maximum of 60% use during dormant season and/or where introduced species are managed like range. Some use of low-value forage plants. Some trampling but little evidence of trailing to forage.  Heavy grazing (≥60% use): Use is apparent on all key forage plants at the end of the grazing season, no seed stalks remaining on good forage plants. Low-value forage plants are commonly used. Trampling of and trailing to forage is evident |  |
| <20% of the grazed area meets nesting/bloom period forage/stubble heights and conditions for target wildlife species during the nesting season or other critical wildlife periods as defined by the State Biologist. | 5 |
| 20-50% of grazed area meets nesting/bloom period forage/stubble heights and conditions for target wildlife species during the nesting season or other critical wildlife periods as defined by the State Biologist. | 12 |
| 50% of grazed area meets nesting/bloom period forage/stubble heights and conditions for target wildlife species during the nesting season or other critical wildlife periods as defined by the State Biologist. | 20 |
|  | What percentage of fence, where a wildlife fence hazard potentially exists, meets the State’s wildlife friendly criteria (for example ref. Montana Fish, Wildlife & Parks, A Landowner's Guide to Wildlife Friendly Fences: How to Build Fence with Wildlife in Mind, 2008; Wyoming Game & Fish Department, Fencing Guidelines for Wildlife, 2004)? |  |
| 1. ≤25%. | 0 |
| 1. >25 and ≤50%. | 5 |
| 1. >50% and ≤75%. | 7 |
| 1. >75%. | 9 |
|  | Are artificial water sources present? |  |
|  | 1. No | 8 |
|  | 1. Yes | 0 |
| ***If b) Yes is selected for question number 4, the following additional question should be answered.*** | | |
|  | What percentage of artificial water sources provide for safe access and escape for wildlife, provide year-round water, and are free of hazards for aerial drinking wildlife (e.g., bats, swallows, etc., ref. BCI Wildlife Water Handbook, 2007)? |  |
|  | 1. ≤25%. | 0 |
| 1. >25 and ≤50%. | 4 |
| 1. >50% and ≤75%. | 8 |
| 1. >75%. | 11 |
|  | What is the degree of woody species management? |  |
| 1. Woody species are not managed for wildlife. There is an evident browse line or brush is totally eliminated with brush control measures. | 0 |
| 1. Woody species are managed so that populations are consistent with the desired ecological state or beneficial to target wildlife species. There is absence of a browse line, although hedging on key browse plants may be observed. Brush is only partially eliminated with brush control measures. | 13 |
| 1. Woody species are managed so that populations are consistent with that expected for the ecological site or site potential (e.g., in the Ecological Site Description, if available, or plant composition description from the appropriate WHEG for the target wildlife species). There is absence of a browse line or hedging on key browse plants. If brush is controlled, it is done only partially in patterns that fit the landscape with wildlife considerations. | 20 |
|  | What is the proportion of invasive or noxious plants (as determined by State lists) that have a negative effect on the target wildlife species? |  |
| 1. ≤5% of the site has invasive or noxious plants. | 20 |
| 1. >5 and ≤20% of the site has invasive or noxious plants. | 13 |
| 1. >20% of the site has invasive or noxious plants. | 0 |

Table 171: *Forest Preliminary Assessment Questions and Answer Choices*

|  |  |  |
| --- | --- | --- |
| Question | Forest Preliminary Assessment Questions and Answer Choices | Existing Condition Points |
|  | Do you have a current forest or woodland management plan that contains prescriptions for target wildlife species and measure(s) in the plan are being implemented?  Instructions: Current is defined by State Biologist or designee. |  |
| 1. Yes | 15 |
| 1. No | 0 |
|  | Based on land resource inventory data (soil survey, Ecological Site Description, Conservation Tree/Shrub Groups, other references sites, historical research, etc.), are trees within the forest stand native and likely to have historically existed on site? |  |
| Yes | 15 |
| No | 0 |
|  | Does your forest stand or woodlands type, extent, and management provide sufficient habitat for target wildlife species?  Instructions: Guidance on sufficient habitat for target wildlife species set by State Biologist. |  |
| Yes | 30 |
| No | 0 |
|  | What percentage of the understory cover is expected for the ecological site or site potential (e.g., in the Ecological Site Description, if available, or plant composition description from the appropriate WHEG for the target wildlife species)?  Instructions: Understory cover is defined as the combined cover of native shrubs, vines, and herbaceous. |  |
| >90% | 10 |
| >75% and ≤90% | 8 |
| >50% and ≤75% | 6 |
| >25% and ≤50% | 4 |
| >10% and ≤25% | 2 |
| ≤10% | 0 |
|  | What is the extent and management of invasive species? |  |
| No invasive plants identified, no damage/infestation. | 15 |
| ≤15%, active management. | 11 |
| ≤15%, no active management. | 8 |
| >15%, active management. | 5 |
| >15%, no active management. | 0 |
|  | Are livestock present in the forested area? |  |
| 1. No | 15 |
| 1. Yes, livestock are being utilized to maintain or enhance wildlife habitat according to a Prescribed Grazing Plan. | 15 |
| 1. Yes, livestock are used to maintain wildlife habitat. | 6 |
| 1. Yes, grazing management plan absent or does not consider wildlife AND grazing is detrimental to wildlife habitat. | -15 |

**Associated Agriculture Lands**

Unless a State WHEG has been developed, Associated Agriculture Lands is not being assessed by preliminary assessment questions for wildlife potential at this time due to the diversity of this land use. This land use should still be subject to filtering or prepopulating done by geoprocessing operations of spatial datasets.

**Farmstead**

Unless a State WHEG has been developed, Farmstead is not being assessed by preliminary assessment questions for wildlife potential at this time due to the diversity of this land use. This land use should still be subject to filtering or prepopulating done by geoprocessing operations of spatial datasets.

## **Aquatic Habitat for Fish and Other Organisms**

### Component: Aquatic habitat for fish and other organisms

**Description:** Quantity, quality, or connectivity of water, food, cover and space, is inadequate to meet requirements of identified fish or other organisms.

**Objective:** Provide water that is sufficient in quality, quantity, habitat complexity, and extent to meet target species or guild habitat requirements, remove barriers to enable aquatic species movement and improve associated riparian habitat to meet target species or guild habitat requirements.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined, Water**

The planner may identify this resource concern based on site-specific conditions, client input, or both. If the water land use or the water feature modifier has been identified on the land unit, and Aquatic Habitat is selected as a Resource Concern to assess, a default threshold value of 50 will be set and the Assessment Method question will be triggered (see Table *166*). Planners can select the “Working Lands for Wildlife Guide or State Wildlife Guide option and answer the Aquatic Habitat Exiting Condition below (see Table 172).

In the future, a web service will be used to determine if the PLU is located within or contains a priority aquatic habitat area (e.g., Threatened/Endangered Species (USFWS ECOS, NOAA NMFS Endangered Species Act Critical Habitat), Essential Fish Habitat, Section 303(d) of the Clean Water Act for temperature and sediment, NatureServe National Species Dataset)

Table 172*: Aquatic Habitat Existing Condition*

|  |  |  |
| --- | --- | --- |
| Answer | Existing Condition Points | Reference for Assessment Condition |
| Excellent | 70 | Habitat quality is defined as *excellent* for the priority species. (SVAP2 9-10, WHEG range 0.7 to 1.0, or other State approved assessment) |
| Good | 51 | Habitat quality is defined as *good* for the priority species. (SVAP2 7-8.9, WHEG range 0.5 to <0.7, or other State approved assessment) |
| Fair | 30 | Habitat quality is defined as *fair* for the priority species. (SVAP2 5-6.9, WHEG range 0.3 to <0.5, or other State approved assessment) |
| Poor | 10 | Habitat quality is defined as *poor* for the priority species. (SVAP2 <5, WHEG range 0.1 to <0.3, or other State approved assessment) |
| Absent | 1 | Habitat for the priority species is absent or of such low quality to be effectively absent. |

Preliminary assessment questions below will be answered based on the applicable water feature within the PLU. In order to select a water feature, the water feature modifier must first be selected for a land use on the Assessment Summary page in CART. NOTE: If SVAP2 (or other State approved assessment protocol) has already been run on the PLU and the evaluation scores the property as Excellent, Good, Fair, or Poor, points can be assigned per Table 172 and Preliminary Questions listed below may be bypassed (i.e., they do not need to be answered).

Table 173*: Preliminary Aquatic Habitat Assessment Questions and Answer Choices*

|  |  |  |
| --- | --- | --- |
| Question | Aquatic Habitat Preliminary Assessment Questions and Answer Choices | Existing Condition Points |
|  | What water features are present on the PLU?  Instructions: Select all that apply. (Might be prepopulated by geoprocessing USGS NHD/NHDPlus HR geospatial dataset. Should also have a text entry box or link to/instructions to complete Conservation Assistance Notes to indicate and describe multiple water features of the same type on the PLU as well as specific on individual features of the same type so they can be distinguished in the future.) |  |
| Lake/Pond | *See Lake/Pond questions* |
| River (non-wadeable) | *See River questions* |
| Stream (wadeable) | *See Stream questions* |
| Wetland | *See Wetland questions* |
| ***Lake/Pond*** | | |
|  | What is the extent of the natural vegetation surrounding the lake and pond?  Instructions: For this element, “natural vegetation” means plant communities with species native to the site or introduced species that have become “naturalized” and function similarly to native species. Plant communities should consist of multiple structural layers (e.g., grasses and forbs, shrubs, and trees) of different age-classes. |  |
| >75% of the perimeter of the lake/pond that is suitable for plant growth consists of at least a 35-foot-wide zone of native or natural vegetation. | 50 |
| >50% but ≤75% of the perimeter of the lake/pond that is suitable for plant growth consists of at least a 35-foot-wide zone of native or natural vegetation. | 33 |
| >10% but ≤50% of the perimeter of the lake/pond that is suitable for plant growth consists of at least a 35-foot-wide zone of native or natural vegetation. | 16 |
| ≤10% of the perimeter of the lake/pond suitable for plant growth consists of at least a 35-foot-wide zone of native or natural vegetation. | 0 |
|  | What is the quality of the riparian zone?  Instructions: This element rates the functional value of the riparian zone (e.g., vegetation surrounding the lake/pond) to protect the lake or pond from shoreline erosion and provide habitat components for fish and wildlife. Plant communities should consist of multiple structural layers (e.g., grasses, forbs, shrubs, and trees). For the highest ratings, there should be no evidence of concentrated flows, as defined in SVAP2. |  |
| Natural and diverse riparian vegetation with composition, density, and age structure appropriate for the site, no invasive species present, and no evidence of concentrated flows. | 50 |
| Natural and diverse riparian vegetation with composition, density, and age structure appropriate for the site, invasive species present in small numbers (20% cover or less), no concentrated flows. | 33 |
| Natural vegetation present but compromised by poor management; evidence of concentrated flows; invasive species common (>20% to 50% cover). | 16 |
| Little or no natural vegetation in the riparian zone, >50% cover invasive species, and evidence of concentrated flows into the lake/pond. | 0 |
| ***River*** | | |
|  | Is water available year-round or in quality and extent to support habitat requirements for target wildlife species?  Instructions: Guidance on habitat requirements for target wildlife species set by State Biologist. |  |
| 1. Yes | 34 |
| 1. Otherwise | 0 |
| ***If “b) Otherwise” is selected for question number 1 above, the following additional question 2) should be answered.*** | | |
|  | Is the lack of water caused by offsite conditions?  Instructions: Lack of water may be due to conditions outside of control of the producer and landowner. This question is a way to note that situation. |  |
| Yes | 0 |
| No | -15 |
|  | Are there physical structures, water withdrawals, water quality, or some combination of these within landowner control that restricts or prohibits movement of aquatic species?  Instructions: This will be prepopulated by a spatial dataset when available, but datasets are often unreliable at the PLU level and passage conditions must be verified on site. Coordinate with State Technical Specialist for passage requirements of local target species |  |
| 1. Yes, verified in field. | -15 |
| 1. No, verified in field. | 33 |
|  | Is natural and diverse riparian vegetation that extends at least one bankfull width onto the floodplain, with vegetation gaps not exceeding 10% of the property length present?  Instructions: Riparian vegetation must be of appropriate composition, density, and age structure appropriate to the site. For this element, “natural vegetation” means plant communities with species native to the site or introduced species that have become “naturalized” and function similarly to native species. Plant communities should consist of multiple structural layers (e.g., grasses and forbs, shrubs, and trees). |  |
| 1. Yes | 33 |
| 1. No | 0 |
| ***Stream (wadeable)*** | | |
|  | Are there eight or more aquatic habitat features present on the PLU stream reach, defined as 12 x bankfull width?  Instructions: Aquatic habitat features include: 1) Logs &/or large wood- 2/reach; 2) Small wood accumulations- 1/reach; 3)Deep pools- 2/reach; 4) Secondary pools- 4/reach; 5) Overhanging veg- 3/reach; 6) Large boulders-3/reach if no wood, 2/reach if wood present; 7) Small boulder clusters- 3/reach; 8) Cobble riffles- 2/reach; 9) Undercut banks- 3/reach; 10) Thick root mats- 3/reach; 11) Macrophyte beds- 1/reach; 12) Off-channel habitats- 2/reach; 13) Other locally important habitat feature. From SVAP2 manual. |  |
| Yes | 25 |
| No | 0 |
|  | Is water available year-round or in quality and extent to support habitat requirements for target aquatic species?  Instructions: Guidance on habitat requirements for target aquatic species set by State Biologist. |  |
| 1. Yes | 25 |
| 1. No | 0 |
| ***If b) No is selected for question number 2, the following additional question should be answered.*** | | |
|  | Is the lack of water caused by off-site conditions?  Instructions: Lack of water may be due to conditions outside of control of the producer and landowner. This question is a way to note that situation. |  |
| 1. Yes | 0 |
| 1. No | -15 |
| 4) | Are there physical structures, water withdrawals, water quality, or some combination of these within landowner control that restricts or prohibits movement of aquatic species?  Instructions: (This should be prepopulated by a spatial dataset (Fish Passage Barriers (known and potential)). If detected should prompt for a requirement of verification on-site for habitat presence.) |  |
| 1. Yes, verified in field. | -15 |
| 1. No, verified in field. | 25 |
| 5) | Is natural and diverse riparian vegetation that extends at least one bankfull width onto the floodplain, with vegetation gaps not exceeding 10% of the property length present?  Instructions: Riparian vegetation must be of appropriate composition, density, and age structure appropriate to the site. For this element, “natural vegetation” means plant communities with species native to the site or introduced species that have become “naturalized” and function similarly to native species. Plant communities should consist of multiple structural layers (e.g., grasses and forbs, shrubs, and trees). |  |
| 1. Yes | 25 |
| 1. No | 0 |
| ***Wetland*** | | |
| 1) | What is the extent of the riparian buffer around the wetland?  Instructions: This element rates the extent of buffer around the perimeter of a wetland. Estimate the width of the vegetation zone from the edge of the wetland out to the edge of the cropland, range or forest |  |
| 1. >75% of the perimeter of the wetland is buffered by a >35-ft-wide strip of perennial vegetative cover. | 34 |
| 1. ≥50% but ≤75% of the perimeter of wetland is buffered by a >35-ft-wide strip of perennial vegetative cover. | 23 |
| 1. ≥10% but <50% of the perimeter of the wetland is buffered by a >35-ft-wide strip of perennial vegetative cover. | 10 |
| 1. <10% of the perimeter of the wetland is buffered by a ≥35-ft-wide strip of perennial vegetative cover. | 4 |
|  | What is the quality of the riparian buffer around the wetland?  Instructions: For this element, “natural vegetation” means plant communities with species native to the site or introduced species that have become “naturalized” and function similarly to native species. Plant communities should consist of multiple structural layers (e.g., grasses and forbs, shrubs, and trees). |  |
| Natural and diverse riparian vegetation with composition, density, and age structure appropriate for the site. Little or no invasive species present. | 33 |
| Natural and diverse riparian vegetation with composition, density, and age structure appropriate for the site, invasive species (<30% of plant cover), and landowner is taking measures to control their spread. | 23 |
| Natural vegetation compromised invasive species (>30% but <50% of plant cover). | 10 |
| Little or no natural vegetation. Invasive species widespread (>50 % of plant cover). | 0 |
|  | What is the quality of the vegetation within the wetland?  Instructions: For this element, “natural vegetation” means plant communities with species native to the site or introduced species that have become “naturalized” and function similarly to native species. Plant communities should consist of multiple structural layers (e.g., grasses and forbs, shrubs, and trees). |  |
| 1. Natural and diverse hydrophytic vegetation with composition, density, interspersion, and age structure appropriate for the site. Little or no invasive species present. | 33 |
| 1. Natural and diverse hydrophytic vegetation with composition, density, interspersion, and age structure appropriate for the site, invasive species (<30% of plant cover), and landowner is taking measures to control their spread. | 23 |
| 1. Natural vegetation compromised by invasive species (>30% but <50% of plant cover). | 10 |
| 1. Little or no natural vegetation. Invasive species widespread (>50 % of plant cover). | 0 |
|  | Are there physical structures (e.g., drainage tile, ditches, diversions) or water withdrawals that negatively affect the sites natural hydrology and ability to provide habitat for target aquatic species? |  |
| Yes | -10 |
| No | 0 |

## **Elevated Water Temperature (Water Temperature)**

### Component: Water temperature effects on aquatic habitat

**Description:** Surface water temperatures exceed State or Federal standards in downstream receiving waters which limits its use for identified fish or as aquatic habitat.

**Objective:** Lower stream water temperature and/or prevent additional water temperature increases in downstream receiving waters.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined, Water**

A standard threshold value of 50 will be set. The existing condition question will be triggered, and points will be assigned based on the answers seen in Table 174.

Table 174*: Section 303(d) listing of Clean Water Act for Temperature is caused by onsite conditions*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Yes | 1 |
| No | 30 |

Preliminary assessment questions will be asked as part of the River and Stream Preliminary Aquatic Habitat Assessments to further assess PLU existing condition. The planner may also identify this resource concern based on site-specific conditions. Conservation practices and activities are then added to the existing condition to determine the state of the management system.

Table 175*: Preliminary Elevated Water Temperature Assessment Questions*

|  |  |  |
| --- | --- | --- |
| Question | Answer | Existing Condition Points |
| Is natural and diverse riparian vegetation that extends at least one bankfull width onto the floodplain, with vegetation gaps not exceeding 10% of the property length present?  Instructions: Riparian vegetation must be of appropriate composition, density, and age structure appropriate to the site. Based on planning criteria for elevated water temperature that is conditional on SVAP2 elements 4 & 5 riparian area quantity and quality. | Yes | 25 |
| No | 0 |
| Is ≥50% of water surface shaded within the length of the stream in landowner’s property??  Instructions: Applicable to both cold-water and warm-water streams. Based on planning criteria for elevated water temperature that is conditional on SVAP2 element 6 canopy cover. This element is particularly sensitive to the type of stream (stream class) and fish community that is being assessed and calibration of scoring may be necessary. Planner override may be used when the specific onsite conditions dictate that a "No" answer relates to beneficial effect. | Yes | 25 |
| No | 0 |

## **Feed and Forage Balance**

### Component: Feed and forage imbalance

**Description:** Feed and forage quality or quantity is inadequate for nutritional needs and production goals of the kinds and classes of livestock.

**Objective:** Balance the quantity and quality of feed and forage to meet livestock needs and reduce negative impacts to other resources.

**Analysis within CART:**

The planner will identify this resource concern based on site-specific conditions using technically completed land health and management assessment methods. A threshold value of 50 will be set and existing condition question will be triggered. The existing condition question will set the existing score as seen in Table 176 and Table 177.

**Crop (grazed), Forest (grazed)**

Table 176: Livestock Feed and Forage – Grazed Crop/Grazed Forest

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Adequate forage supply and producer desired goals are being met | 51 |
| Inadequate forage supply and producer desired production goals are NOT being met | 1 |

**Farmstead**

Table 177: Livestock Feed and Forage - Farmstead

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Livestock feed, roughage, and supplemental nutritional requirements are met | 51 |
| Livestock feed, roughage, and supplemental nutritional requirements are NOT met | 1 |

**Pasture**

Table 178a: *Livestock Feed and Forage - Pasture*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Adequate forage budget (pasture and supplemental feed) and producer desired goals are being met | 51 |
| Inadequate forage supply and producer desired production goals are NOT being met. Pasture Condition Score – Percent Desirable Plants **and** Plant Diversity by Dry Weight Indicators and Grazing Utilization and Severity Indicators 4-5 scores | 30 |
| Inadequate forage supply and producer desired production goals are NOT being met. Pasture Condition Score – Percent Desirable Plants **and** Plant Diversity by Dry Weight Indicators 3 score or below. | 1 |

**Range**

Table 179b: *Livestock Feed and Forage - Range*

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Adequate forage budget (pasture and supplemental feed) and producer desired goals are being met | 51 |
| Inadequate forage supply and producer desired livestock production goals are NOT being met. Range- Interpreting Indicators of  Range Health   - Biotic Integrity Attribute Score is None to Slight departure. | 30 |
| Inadequate forage supply and producer desired livestock production goals are NOT being met. Range- Interpreting Indicators of Range Health - Biotic Integrity Attribute Score is Slight to Moderate or more departed. | 1 |

## **Inadequate Livestock Shelter**

### Component: Inadequate livestock shelter

**Description:** Livestock lack adequate shelter from climatic conditions to meet basic needs.

**Objective:** Supply adequate shelter to meet grazing livestock needs.

**Analysis within CART:**

**Associate Agriculture Land, Crop** **(grazed), Developed Land, Farmstead, Forest (grazed), Other Rural Land, Pasture (grazed), Range (grazed)**

The planner will identify this resource concern based on site-specific conditions. A threshold value of 50 will be set and existing condition questions will be triggered. The existing condition question will set the existing score as seen in Table 180.

Table 180: Inadequate Livestock Shelter Existing Condition

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Livestock are adapted to local climatic conditions and do not require additional shelter | 51 |
| Livestock have adequate shelter (artificial or natural) | 51 |
| Production goals are not being met due to livestock stresses caused by local climatic conditions or lack of shelter | 20 |
| Production goals not being met due to livestock death caused by local climatic conditions or lack of shelter | 1 |

## **Inadequate Livestock Water Quantity, Quality and Distribution**

### Component: Inadequate livestock water quantity, quality and distribution

**Description:** Quantity or quality of drinking water are insufficient to meet basic needs for the kind and class of livestock and improper distribution negatively impacts other resources.

**Objective:** Supply adequate quantity and quality of water to meet basic livestock needs and assure proper distribution to reduce negative impacts to other resources. \***Lack** of adequate water access creates this resource concern.

**Analysis within CART:**

**Crop (grazed), Farmstead, Forest (grazed), Range (grazed), Pasture (grazed)**

The planner will identify this resource concern based on site-specific conditions. A threshold value of 50 will be set and existing condition questions will be triggered. The existing condition questions will set the existing score as seen in Table *181*.

Table 181: Inadequate Livestock Water Existing Condition (Quality, Quantity, and Distribution factors)

Note: Livestock water factors are Quality, Quantity, and Distribution.

|  |  |
| --- | --- |
| Answer | Existing Condition Points |
| Three of the above livestock water factors met | 51 |
| Two of the above livestock water factors met | 40 |
| One of the above livestock water factor met | 20 |
| None of the above livestock water factors met | 1 |

# **Energy**

## **Energy Efficiency of Equipment and Facilities**

### Component: Energy efficiency of equipment and facilities

**Description:** Stationary equipment or facilities are using energy inefficiently. In addition to energy use in and around buildings on the farmstead, this includes other stationary equipment such as grain dryers or commodity storages as well as equipment in the field such as irrigation pumps, irrigation systems, and center pivots.

**Objective:** Improve energy efficiency of stationary equipment and facilities to reduce energy use.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined, Water**

The planner may identify this resource concern based on client input and site-specific conditions. The planner will have the option to identify what type of buildings are on the PLU. Select “Other” if the PLU has buildings that are not represented in the list or the PLU has multiple buildings that are represented in the list. Select “None” if the PLU does not have any buildings.

Table 182*: What type of buildings are on the PLU?*

|  |
| --- |
| Answer |
| Dairy |
| Swine |
| Poultry |
| Other |
| Greenhouse |
| None |

A threshold value of 50 will be set and existing condition question will be triggered as seen in Table 183. CART will present this question about existing conditions to a user as seen in Table 185.

Refer to appendices for an overview of CART relative to non-CART tools and methods typically used to assess and address energy resource concerns.

Table 183*: Resource Concern Risk Categories for Inefficient Energy Use - Equipment and Facilities*

*Question hover text: What is the risk of Inefficient Energy Use for Equipment and Facilities as determined by the EUI-CART Converter?*

| Answer | Existing Condition Points | Reference for Assessment Condition |
| --- | --- | --- |
| Low | 51 | Energy use is appropriately managed and the potential for a Resource Concern is negligible. The agricultural operations present a minimal risk of energy resource concerns. |
| Moderate | 40 | Energy use is controlled well.  A Resource Concern exists to a moderate degree. |
| High | 25 | Energy use is marginally controlled.  A Resource Concern exists to a high degree. |
| Severe | 15 | Energy use is poorly controlled.  A Resource Concern exists to a severe degree and merits priority. |
| Extreme | 1 | Energy use is effectively uncontrolled.  A Resource Concern exists to an extreme degree and merits elevated priority. |

## **Energy Efficiency of Field Operations**

### Component: Energy efficiency of field operations

**Description:** Mobile on-farm, field operations are using energy inefficiently. This includes use of tractors, trucks or other mobile equipment as well as changes in farming/ranching and forestry practices that reduce energy use such as making fewer trips across the field or implementing practices that result in less energy use.

**Objective:** Improve energy efficiency of mobile farming, ranching, forestry practices and field operations to reduce energy use.

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Undetermined, Water**

The planner may identify this resource concern based on client input and site-specific conditions. A threshold value of 50 will be set and existing condition question will be triggered. CART will present this question about existing conditions to a user as seen in Table 184*: Resource Concern Risk Categories for Inefficient Energy Use – Field Operations*.

Refer to appendices for an overview of CART relative to non-CART tools and methods typically used to assess and address energy resource concerns.

Table 184*: Resource Concern Risk Categories for Inefficient Energy Use – Field Operations*

Note: What is the risk of Inefficient Energy Use for Farming/Ranching Practices and Field Operations as determined by the EUI-CART Converter tool?

| Answer | Existing Condition Points | Reference for Assessment Condition |
| --- | --- | --- |
| Low | 51 | Energy use is appropriately managed and the potential for a Resource Concern is negligible. The agricultural operations present a minimal risk of energy resource concerns. |
| Moderate | 40 | Energy use is controlled well.  A Resource Concern exists to a moderate degree. |
| High | 25 | Energy use is marginally controlled.  A Resource Concern exists to a high degree. |
| Severe | 15 | Energy use is poorly controlled.  A Resource Concern exists to a severe degree and merits priority. |
| Extreme | 1 | Energy use is effectively uncontrolled.  A Resource Concern exists to an extreme degree and merits elevated priority. |

# **Appendices**

## **Appendix A: Acronyms**

AgEMP Agriculture Energy Management Plan

BSMPs Basic Smoke Management Practices

Btu British Thermal Unit (normalized energy inputs)

CART Conservation Assessment Ranking Tool

CEAP Conservation Effects Assessment Program

CNMPS Conservation Nutrient Management Plans

CPDES Conservation Practice Data Entry System

CPPE Conservation Practice Physical Effects

DIPH Determining Indicators of Pasture Health

EE Energy Efficiency (when used in the context of energy conservation)

EPA Environmental Protection Agency

ESD Ecological Site Description

EUI Energy Use Index/Indices

FEMA Federal Emergency Management Agency

FIRI Farm Irrigation Rating Index

FOTG Field Office Technical Guide

HPS High-Pressure Sodium

HVLS High-Volume Low-Speed

IIRH Interpreting Indicators of Rangeland Health

NAQSAT National Air Quality Site Assessment Tool

NOx Nitrogen Oxides

NRCS Natural Resources Conservation Service

NRT NRCS Reference Tables

PCS Pasture Condition Score Sheet

PM Particulate Matter

PLU Planned Land Unit

RC Resource Concern

RHR Refrigerant Heat Recovery

SCI Soil Conditioning Index

STIR Soil Tillage Intensity Rating

SSURGO NRCS published soils database

SVAP2 Stream Visual Assessment Protocol, Version 2

T/E Threatened/Endangered Species

USDA U.S. Department of Agriculture

VER Ventilation Efficiency Ratio (typically rendered as CFM/W or CFM/HP)

VFD Variable Frequency Drive (see ASD, VSD)

VOC Volatile Organic Compounds

VSD Variable Speed Drive (see ASD, VFD)

WHEG Wildlife Habitat Evaluation Guide

## **Appendix B: Glossary**

**Answer Choice:** The outcome of a question that results in the assignment of points for the assessment or ranking score.

**Client:** An individual, business, group, or unit of government that is the recipient of NRCS technical and financial assistance. NRCS clients generally fall into two broad categories: individual owners, managers, partners or businesses, with primary responsibility for their business dealings with NRCS, and groups or local sponsoring organizations or other government officials, responsible for fulfilling requirements or exercising judgments consistent with law, Executive order, and established Federal policy. Examples of the first group include persons, groups, Tribes, corporations, and organizations. Examples of the second group include conservation districts and units of government.

**Conservation:** The use and management of natural resources according to principles and practices that assure their sustained productivity.

**Conservation Plan:** A record of the client’s decisions and supporting information for treatment of a unit of land for one or more identified natural resource concerns as a result of the planning process. The plan describes the schedule of implementation for practices and activities needed to solve identified natural resource concerns and takes advantage of opportunities. The needs of the client, the resources, and Federal, State, Tribal, and local requirements will be met.

**Conservation Planning:** The activity of NRCS and others in helping a client use the planning process, which is intended to result in a conservation plan or an areawide conservation plan.

**Conservation Practice:** A specific treatment, such as a structural or vegetative measure, or management technique, commonly used to meet specific needs in planning and implementing conservation, for which standards and specifications have been developed. Conservation practices are contained in the FOTG, Section IV, which is based on the National Handbook of Conservation Practices (NHCP).

**Existing Condition:** The pre-planning condition of a planning area that is used as a point of reference to measure changes in resource conditions resulting from conservation treatment. The existing condition is a statement of the identified resource concerns, special environmental concerns, current management and existing conservation practices.

**Existing Condition Points**: The values assigned to credit the underlying management system that is currently in place. These Existing Condition points are added to Practice Points for each of the existing practices. That sum is compared to management thresholds assigned by CART Assessment modules to evaluate the management system’s adequacy for the level of site risk.

**Existing Practices:** Existing conservation practices included in the current management system for the planning unit. These practices meet NRCS standards and specifications.

**Field Office Technical Guide:** The official NRCS guidelines, criteria, and standards for planning and applying conservation treatments (450-GM, Part 401).

**Geospatial:** Pertaining to the geographic location and characteristics of natural or constructed features and boundaries on, above, or below the earth's surface; especially referring to data that is geographic and spatial in nature.

**NRCS Reference Tables:** NRT - NRCS maintains a database of common domains, called the NRCS Reference Tables (NRT), which NRCS applications access. The system works such that when a value is added or changed in the NRT, all applications will get the change simultaneously.

The NRT is designed to reduce the *stove-piping* of systems among the many NRCS applications, domains are shared across systems to provide commonality. As an example, a practice code in one system is the same practice code found in another system. This allows data to be compared across systems using a domain value as a common key.  The CPDES web-based application is designed to manage domain data and relationships entered by NRCS national and state data stewards. It then publishes the resulting information to the NRCS Reference Tables (NRT) for consumption by NRCS systems.  The data managed by CPDES includes information regarding practice standards, resource concerns and conservation assessment practice points for individual practices and resource concern components.

**Planned Practices:** Additional conservation practices that are not currently included in the management system but are being evaluated for implementation.

**Planner**: A person, qualified by training and experience, who effectively assists the client in completing the planning process.

**Planner Override:** When a planner can identify through observation or other assessment method that planning criteria has or has not been met, but may be outside or improperly recognized using the streamlined CART questions, information, and analysis framework designed to capture typical conditions.

**Planning Criteria:** A quantitative or qualitative statement of the minimum level of treatment required to address a given resource concern for a particular land area.  It is established in accordance with local, State, Tribal, territorial, and Federal programs and regulations in consideration of ecological, economic, and social effects.

**Planning Land Unit:** A PLU is a unique geographic area, defined by a polygon, that has common land use and is owned, operated, or managed by the same client or clients. The PLU is the minimum unit for planning.

**Practice Points:** The value assigned to an individual practice and resource concern component that credits the effect of the practice on the resource concern component. Practice Points can apply to the Existing Condition or be planned to address a management system’s inadequacy for the level of site risk.

**Priorities:** Other priorities to consider (ex. Critical watershed or wildlife habitat) which are used in ranking.

**Question:**  A text sentence or geospatial expression used to elicit a result equal to an associated choice.

**Site Vulnerability:** Level of risk present on a PLU for identified resource concern(s).

**Supplemental Energy:** Resources used to meet energy needs beyond sunlight.

**Supporting Practice:** (Also known as a Facilitating Practice) A conservation practice that facilitates management or the function of another practice, or both, but does not achieve the desired effects on its own.  Example: A fence is a facilitating practice for prescribed grazing.  Prescribed grazing helps improve forage for livestock.

**Resource Concern:** The resource condition that does not meet minimum acceptable condition levels as established by resource planning criteria shown in the FOTG, Section III. This implies an expected degradation of the soil, water, air, plant, animal or energy resource base to the extent that the sustainability or intended use of the resource is impaired.  Because NRCS quantifies or describes resource concerns as part of a comprehensive conservation planning process, that includes client objectives, human factors are considered components of the resource base.

An example resource concern is “nutrients transported to surface water”.

**Resource Concern Category:** Used to organize resource concerns into groups that have functional similarities. For example, “Field Sediment, nutrient and pathogen loss” is the resource concern category for the following resource concerns: nutrients transported to surface water, nutrients transported to groundwater, pathogens and chemicals from manure, biosolids, or compost applications transported to surface water, pathogens and chemicals from manure, biosolids, or compost applications in groundwater, and sediment transported to surface water.

**Resource Concern Component:** For planning purposes, some resource concerns are divided into components where there is a clear distinction in the causal factors, the mitigating actions, and the anticipated environmental effect. For example, “Nonpoint nitrogen surface loss” and “Nonpoint phosphorus surface loss” are both components of the resource concern “nutrients transported to surface water”.

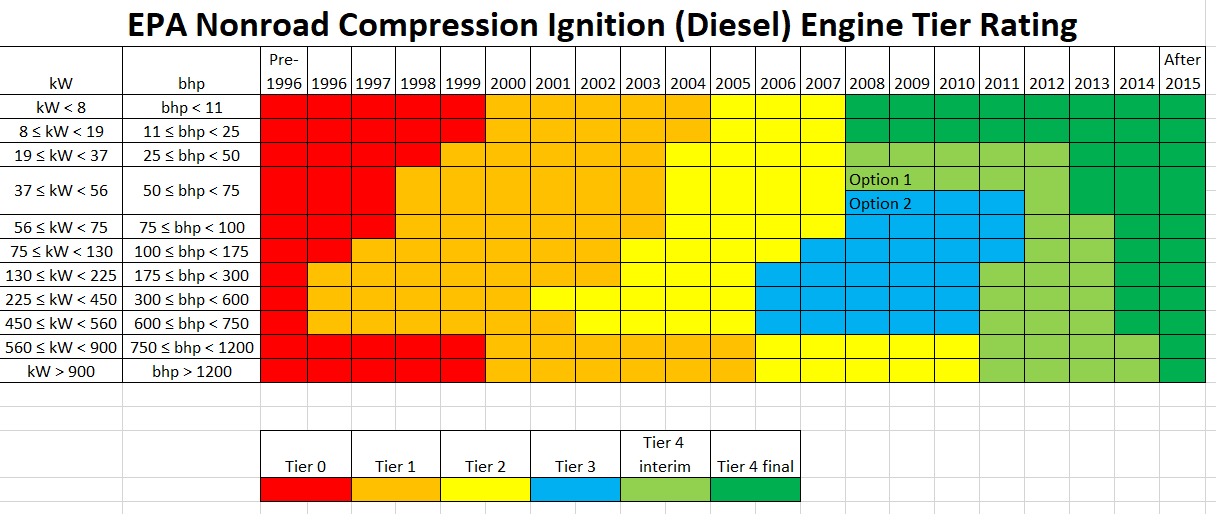
**Threshold:** Measure of intrinsic site vulnerability and amount of conservation effort to reach a “sustainable” level. Thresholds may be normalized at 50 points but are representative of NRCS planning criteria.

## **Appendix C: CART Soil Data Access Web Services**

Link to view documentation:<https://jneme910.github.io/CART/>

## **Appendix D: EPA Nonroad Compression Ignition (Diesel) Engine Tier Rating**

See the CART Employee SharePoint page for a downloadable version of this table that can be printed to PDF: <https://usdagcc.sharepoint.com/:x:/r/sites/nrcs/intranet/Shared%20Documents/CART/Engine%20EPA%20Tier%20Chart_091720.xlsx?d=we362f4a622ac489e877a57a413bc7d59&csf=1&web=1&e=poWdMW>



## **Appendix E: CART Energy Module**

CART provides a limited analysis of energy resource concerns and conservation practices to improve benchmark conditions.

The streamlined process supported by CART and off-CART tools assists a planner with these actions:

* Estimate the energy use intensity of a client’s principal enterprises.
* Prioritize the order of follow up to address higher-risk energy resource concerns.
* Assess equipment, systems, and management decisions that determine the client’s energy use intensity.
* Identify well-proven practices, eligible for rapid contract action, to increase the energy efficiency of the client’s operations and reduce energy use.

CART functions are leveraged through an expanded set of off-CART tools. See the “Energy Planning Criteria” section below for step-by-step process to assess energy using CART and off-CART tools.

**CART Data Fields**

Planner acquires two sets of data to assess the CART existing condition points value.

* + - 1. Energy input data, per Table 185
      2. Primary, relevant enterprises data, per Table 186

Note that an NRCS agricultural energy management plan (AgEMP) will generally include the data needed for these tables.

Table 185: *Annual Energy Input Data Table*

| **Category [A]** | **Budget ($/yr) [B]** | **Est. Quantity (Units) [B]** | | **Type** | **Notes** |
| --- | --- | --- | --- | --- | --- |
| Diesel Fuel |  |  | gal/yr | n/a |  |
| Nitrogen Fertilizer |  |  | Lb/yr |  | [1] |
| Electricity |  |  | kWh/yr | n/a |  |
| Propane |  |  | gal/yr | n/a |  |
| Natural Gas |  |  | Varies | n/a | [2] |
| Purchases to be determined |  |  | Varies |  | [3] |
| Onsite Generation |  |  | kWh/yr |  | [4] |
| Onsite Renewable Heat |  |  | Varies |  | [5] |

Table Notes

▪ Expand rows to accommodate multiple energy resources for onsite generation, heat sources, or allocate a specific resource to two or more distinct parts of the operation (see note [A]).

▪ Take notes of contracted work (e.g., harvesting) that includes fuel used and purchased by others. That can help resolve problems with energy balance or indicate conditions that can’t be handled in CART.

[A] Record cases where individual electric meters, multiple propane tanks, or other energy purchases can be more closely linked to a specific part of the operation.

* Irrigation pumps, residences, farm offices, or groups of farm buildings (e.g., farm stands or stores) may have independent electric meters.
* Note where electric service meters or fuel sources (e.g., propane or diesel tank) include any residential dwellings. (The tools use this to isolate enterprise energy use from residential structures.)

[B] Estimated budget serves as a minimum data tier to proceed with CART. Estimated purchase quantities, if available, improves accuracy. An annual budget estimate is good enough to use the EUI-CART converter. (For more information on the EUI-CART converter, reach out to your State Energy point of contact.)

* A planner might ask, “About how much do you budget for diesel every year?”
* Some producers will track actual energy purchases.
* Collect both cost and energy values when possible to reduce errors in downstream analysis.
* Three significant digits are typically adequate for budget or quantity values.
  + Two digits is fine for values below 1,000.

[1] Record use of green or animal manures if more than a marginal contributor of fertilizer. (For purposes of CART and the EUI-CART converter, consider a contribution of less than 10% from non-synthetic fertilizers as “marginal.”)

[2] Record natural gas units of purchase that apply to the producer. The standard unit of sale varies by location. Refer to the EUI-CART Converter User Guide for further detail.

[3] Allows entries for less typical energy sources.

[4] Onsite generation is recorded to learn if renewable resources (biogas, PV, wind, hydro, etc.) and/or fossil-resources (diesel, propane, etc.) support farm operations on a regular and substantive basis.

* Infrequent use of emergency generators can be ignored.
* A planner might ask, “About how many days a year do you use the generator?”
* Further analysis may be required to resolve issues related to onsite generation.

[5] Onsite RR heat is recorded to learn if biogas, wood, solar, or other renewable resources are used to provide onsite heat. (See note [4] for methods to assess this use.)

Table 186: *Primary, Relevant Enterprises Data Table*

| **Enterprise Categories [A]** | | | | **Scale of Operation** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Primary** | **Secondary** | **Condition** | **Value** | **Unit** | **Type** | **Notes** |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

The planner uses the data to derive the existing condition points value with the EIU-CART converter. (For more information on the EUI-CART converter, reach out to your State Energy point of contact.)

CART methodology establishes risk categories shown in the energy use intensity in Table 183 and Table 184*: Resource Concern Risk Categories for Inefficient Energy Use – Field Operations*.

Draft structure of underlying CART data tables are shown in Table 187 and Table 188.

Table 187: *CART Data Exported to EUI-CART Converter*

|  |  |  |
| --- | --- | --- |
| Item | Description | Intake Set |
| 1 | Unique Customer ID | Core |
| 2 | Enterprise Data | Enterprise Data |
| 3 | Energy Input Data | Energy Input Data Table |

Table 188: *Enterprise Data Fields*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Description | Entry | Unit | Note |
| 1 | Enterprise Category | Drop-Down | N/A | Enterprise Data |
| 2 | Enterprise Subcategory | Drop-Down | N/A | Enterprise Data |
| 3 | Scale (Size Basis) | Value | Varies | Energy Input Data |
| 4 | Scale (Production Basis) | Value | Varies |  |

**CART Process to Assess Energy Concerns, Step-by-Step**

1. Planner collects basic information to estimate EUI for applicable enterprises.
   1. This information is intended to be approximate, annual values based on typical, expected conditions. Typical conditions include normal weather and markets, an absence of avian flu or similar illness, or other events that disrupt usual operations. (See EUI-CART converter for other details.)
   2. Ask if the producer has a previously completed energy analysis related to the PLU being evaluated. (The analysis may be an NRCS CAP 128, *Agricultural Energy Management Plan* or similar report from USDA-RD, an electric or natural gas utility, State energy office, conservation district, or others.)
      * The CAP 128 plan criteria require the primary energy input data needed. Other studies will typically have this data also.
      * Be aware that an acceptable analysis may be tagged with a variety of names: audit, assessment, report, etc. The scope or quality of the content cannot be reliably predicted by the title of the document.
      * Find out if the operation associated with the PLU is significantly different than when the energy analysis was done.
        + Confirm that any analysis reflected “typical, expected” conditions.
        + Generally, operations that remain within about 15 percent of scope or scale of production when evaluated will not require updated information.
        + Talk a bit further with the producer if, for example, the energy analysis looked at a 200-cow dairy herd that has grown by more than about 40 cows. (At a more detailed level, if the producer indicates that milk yield has changed more about 15 percent due to a change in the herd size combined with a different feed regime.)
      * Find out if the producer plans to modify operations in the near-term (next year or two) in similarly substantive way. (In order to plan for future conditions rather than the past.)
   3. If no energy study is available, or some gaps remain, ask about the producer’s approximate, annual energy inputs to complete Table 185.
      * Refer to Table 185 notes about individual electric meters, residential dwellings, and other details to record that improve the analysis of energy concerns and potential practices to address identified concerns appropriately.
   4. Ask the producer about their most important enterprises, crops, or other operations.
      * Learn about the producer’s objectives and priorities in terms of principal crops or livestock to complete Table 186.
      * As with energy input, the planner will need details at an order of magnitude to understand what matters most to the producer.
   5. Planner enters the enterprise and energy input data into CART.

Table 189: *Description for Energy Resource Concerns*

|  |  |  |
| --- | --- | --- |
| **Resource Concern** | **Description of Concern** | **Land Use** |
| *Energy efficiency of equipment and facilities.* | Stationary equipment or facilities are using energy inefficiently. | Any |
| *Energy efficiency of farming and ranching practices and field operations.* | Mobile on-farm, ranching, forestry or field operations are using energy inefficiently. | Crop  Forest  Range  Pasture  Farmstead |

Draft language, as follows, has been considered to clarify the terms used in each description.

Stationary equipment is typically fixed in place for long-term use (many months or years). A variety of farm equipment (e.g., tractors, irrigation systems) may be moved for use in multiple locations but may be operated with a fixed position when in use. This equipment is typically kept in a fixed location for shorter-term use (many hours, days, or weeks) but falls into “equipment and facilities” for that use category relative to the farm operation.

In contrast, “mobile equipment” related to field operations refers to equipment that is not constrained to a fixed position when in use.

Which energy resource concern applies is based on the operation under review. A given piece of equipment may be evaluated for both energy concerns under different circumstances.

A tractor parked to drive an irrigation pump with the PTO is evaluated as “equipment and facilities.” A tractor (in motion) used to till, fertilize, harvest, etc. is evaluated as “field operations.”