| NRCS | United States Department of Agriculture  Natural Resources Conservation Service |
|  | CART Resource Concern Assessment for Fiscal Year 2023  October 11, 2022 |
|  | UNITED STATES DEPARTMENT OF AGRICULTURE  Natural Resources Conservation Service  1400 Independence Ave, SW  Washington, D.C. 20250  USDA logo |

Contents

[**Revision History Notes** 6](#_Toc115784520)

[**Overview** 7](#_Toc115784521)

[**Preliminary Inventory Information** 12](#_Toc115784522)

[**Soil** 16](#_Toc115784523)

[**Sheet and Rill Erosion** 16](#_Toc115784524)

[Component: Sheet and rill erosion 16](#_Toc115784525)

[**Wind Erosion** 23](#_Toc115784526)

[Component: Wind erosion 23](#_Toc115784527)

[**Ephemeral Gully Erosion** 28](#_Toc115784528)

[Component: Ephemeral gully erosion 28](#_Toc115784529)

[**Classic Gully Erosion** 29](#_Toc115784530)

[Component: Classic gully erosion 29](#_Toc115784531)

[**Bank Erosion from Streams, Shorelines, or Water Conveyance Channels** 29](#_Toc115784532)

[Component: Bank erosion from streams, shorelines, or water conveyance channels 29](#_Toc115784533)

[**Subsidence** 33](#_Toc115784534)

[Component: Subsidence 33](#_Toc115784535)

[**Compaction** 34](#_Toc115784536)

[Component: Compaction 34](#_Toc115784537)

[**Organic Matter Depletion** 36](#_Toc115784538)

[Component: Organic matter depletion 36](#_Toc115784539)

[**Concentration of Salts or Other Chemicals** 45](#_Toc115784540)

[Component: Concentration of salts or other chemicals 45](#_Toc115784541)

[**Soil Organism Habitat Loss or Degradation** 46](#_Toc115784542)

[Component: Soil organism habitat loss or degradation 46](#_Toc115784543)

[**Aggregate Instability** 55](#_Toc115784544)

[Component: Aggregate instability 55](#_Toc115784545)

[**Water** 62](#_Toc115784546)

[**Ponding and Flooding** 62](#_Toc115784547)

[Component: Ponding and flooding 62](#_Toc115784548)

[**Seasonal High Water Table** 62](#_Toc115784549)

[Component: Seasonal high water table 62](#_Toc115784550)

[**Seeps** 63](#_Toc115784551)

[Component: Seeps 63](#_Toc115784552)

[**Drifted Snow** 64](#_Toc115784553)

[Component: Drifted snow 64](#_Toc115784554)

[**Surface Water Depletion** 65](#_Toc115784555)

[Component: Surface water depletion 65](#_Toc115784556)

[**Groundwater Depletion** 65](#_Toc115784557)

[Component: Groundwater depletion 65](#_Toc115784558)

[**Naturally Available Moisture Use** 66](#_Toc115784559)

[Components: Moisture management and drought susceptibility 66](#_Toc115784560)

[**Inefficient Irrigation Water Use** 70](#_Toc115784561)

[Component: Inefficient irrigation water use 70](#_Toc115784562)

[**Nutrients Transported to Surface Water (field sediment, nutrient and pathogen loss)** 71](#_Toc115784563)

[Components: Nonpoint nitrogen surface loss and nonpoint phosphorus surface loss 71](#_Toc115784564)

[**Nutrients Transported to Groundwater (field loss)** 75](#_Toc115784565)

[Components: Nonpoint nitrogen leaching loss and nonpoint phosphorus leaching loss 75](#_Toc115784566)

[**Nutrients Transported to Surface Water (storage and handling of pollutants)** 80](#_Toc115784567)

[Component 1: Concentrated nutrient and pathogen effluent from domestic animal confinement, including milkhouse waste and silage leachate 80](#_Toc115784568)

[Component 2: Concentrated nutrient and pathogen surface loss from domestic animals standing in surface water 81](#_Toc115784569)

[Component 3: Concentrated nutrient and pathogen surface loss from storage and handling of manure, compost, biosolids, or non-ag food waste 82](#_Toc115784570)

[**Nutrients Transported to Groundwater (storage and handling of pollutants)** 82](#_Toc115784571)

[Component 1: Concentrated nutrient and pathogen leaching loss from domestic animal confinement, including milkhouse waste and silage leachate 82](#_Toc115784572)

[Component 2: Concentrated nutrient and pathogen leaching loss from storage and handling of manure, compost, biosolids, and non-ag food waste 83](#_Toc115784573)

[**Pesticides Transported to Surface Water** 84](#_Toc115784574)

[Component 1: Nonpoint pesticide surface loss 84](#_Toc115784575)

[Component 2: Nonpoint pesticide drift to surface water 89](#_Toc115784576)

[**Pesticides Transported to Groundwater** 91](#_Toc115784577)

[Component: Nonpoint pesticide leaching loss 91](#_Toc115784578)

[**Pathogens and Chemicals from Manure, Biosolids, or Compost Applications Transported to Surface Water** 95](#_Toc115784579)

[Component: Nonpoint pathogen surface loss 95](#_Toc115784580)

[**Pathogens and Chemicals from Manure, Biosolids, or Compost Applications Transferred to Groundwater** 96](#_Toc115784581)

[Component: Nonpoint pathogen loss to groundwater 96](#_Toc115784582)

[**Salts Transported to Surface Water** 98](#_Toc115784583)

[Component: Salt loss to surface water 98](#_Toc115784584)

[**Salts Transported to Groundwater** 98](#_Toc115784585)

[Component: Salt loss to groundwater 98](#_Toc115784586)

[**Petroleum, Heavy Metals, and Other pollutants (ex. agrichemical mix sites) Transported to Surface Water** 99](#_Toc115784587)

[Component 1: Concentrated agrichemical runoff loss and storage and handling of fertilizer and pesticides 99](#_Toc115784588)

[Component 2: Storage of petroleum or other pollutant containment to surface water 99](#_Toc115784589)

[Component 3: Heavy metals or other pollutants - surface water 100](#_Toc115784590)

[**Petroleum, Heavy Metals, and Other Pollutants Transported to Groundwater** 101](#_Toc115784591)

[Component 1: Concentrated agrichemical leaching loss from storage and handling of fertilizer and pesticides 101](#_Toc115784592)

[Component 2: Storage of petroleum or other pollutant containment to groundwater 102](#_Toc115784593)

[Component 3: Heavy metals or other pollutants- - groundwater 102](#_Toc115784594)

[**Sediment Transported to Surface Water** 103](#_Toc115784595)

[Component: Sediment from erosion sources 103](#_Toc115784596)

[**Air** 111](#_Toc115784597)

[**Emissions of Particulate Matter (PM) and PM Precursors** 111](#_Toc115784598)

[Component 1: PM – diesel engines 111](#_Toc115784599)

[Component 2: PM – non-diesel engine combustion equipment 112](#_Toc115784600)

[Component 3: PM – open burning 115](#_Toc115784601)

[Component 4: PM – pesticide drift 116](#_Toc115784602)

[Component 5: PM – nitrogen fertilizer 117](#_Toc115784603)

[Component 6: PM – dust from field operations 118](#_Toc115784604)

[Component 7: PM – dust from unpaved roads 120](#_Toc115784605)

[Component 8: PM – windblown dust 120](#_Toc115784606)

[Component 9: PM – confined animal activities 121](#_Toc115784607)

[**Emissions of Greenhouse Gases (GHGs)** 122](#_Toc115784608)

[Component 1: GHGs – nitrogen fertilizer 122](#_Toc115784609)

[Component 2: GHGs – carbon stock 123](#_Toc115784610)

[Component 3: GHGs – confined animal activities 133](#_Toc115784611)

[**Emissions of Ozone Precursors (Ozone Precursors)** 134](#_Toc115784612)

[Component 1: Ozone – diesel engines 134](#_Toc115784613)

[Component 2: Ozone – non-diesel engine combustion equipment 135](#_Toc115784614)

[Component 3: Ozone – open burning 137](#_Toc115784615)

[Component 4: Ozone – pesticide VOCs 138](#_Toc115784616)

[Component 5: Ozone – confined animal activities 139](#_Toc115784617)

[**Objectionable Odors (Odor)** 140](#_Toc115784618)

[Component 1: Odor – nitrogen fertilizer 141](#_Toc115784619)

[Component 2: Odor – confined animal activities 141](#_Toc115784620)

[**Emissions of Airborne Reactive Nitrogen (Airborne Nitrogen)** 143](#_Toc115784621)

[Component 1: Reactive nitrogen – diesel engines 143](#_Toc115784622)

[Component 2: Reactive nitrogen – non-diesel engine combustion equipment 144](#_Toc115784623)

[Component 3: Reactive nitrogen – open burning 145](#_Toc115784624)

[Component 4: Reactive nitrogen – nitrogen fertilizer 146](#_Toc115784625)

[Component 5: Reactive nitrogen – confined animal activities 147](#_Toc115784626)

[**Plants** 148](#_Toc115784627)

[**Plant Productivity and Health** 148](#_Toc115784628)

[Component: Plant productivity and health 148](#_Toc115784629)

[**Plant Structure and Composition** 154](#_Toc115784630)

[Component: Plant structure and composition 154](#_Toc115784631)

[**Plant Pest Pressure** 158](#_Toc115784632)

[Components: Plant pest pressure, chemical resistance, and invasive species 158](#_Toc115784633)

[**Wildfire Hazard from Biomass Accumulation** 161](#_Toc115784634)

[Component: Wildfire hazard from biomass accumulation 161](#_Toc115784635)

[**Animals** 163](#_Toc115784636)

[**Terrestrial Habitat for Wildlife and Invertebrates** 163](#_Toc115784637)

[Component: Terrestrial habitat for wildlife and invertebrates 163](#_Toc115784638)

[**Aquatic Habitat for Fish and Other Organisms** 179](#_Toc115784639)

[Component: Aquatic habitat for fish and other organisms 179](#_Toc115784640)

[**Elevated Water Temperature (Water Temperature)** 187](#_Toc115784641)

[Component: Water temperature effects on aquatic habitat 187](#_Toc115784642)

[**Feed and Forage Balance** 189](#_Toc115784643)

[Component: Feed and forage imbalance 189](#_Toc115784644)

[**Inadequate Livestock Shelter** 192](#_Toc115784645)

[Component: Inadequate livestock shelter 192](#_Toc115784646)

[**Inadequate Livestock Water Quantity, Quality and Distribution** 193](#_Toc115784647)

[Component: Inadequate livestock water quantity, quality and distribution 193](#_Toc115784648)

[**Energy** 194](#_Toc115784649)

[**Energy Efficiency of Equipment and Facilities** 194](#_Toc115784650)

[Component: Energy efficiency of equipment and facilities 194](#_Toc115784651)

[**Energy Efficiency of Field Operations** 196](#_Toc115784652)

[Component: Energy efficiency of field operations 196](#_Toc115784653)

[**Appendices** 198](#_Toc115784654)

[**Appendix A: Acronyms** 198](#_Toc115784655)

[**Appendix B: Glossary** 199](#_Toc115784656)

[**Appendix C: CART Soil Data Access Web Services** 202](#_Toc115784657)

[**Appendix D: EPA Nonroad Compression Ignition (Diesel) Engine Tier Rating** 202](#_Toc115784658)

# **Revision History Notes**

|  |  |
| --- | --- |
| **Date** | **Summary Description** |
| 10/1/2020 | Document Version 2.1 for CART for fiscal year 2021 |
| 11/6/2020 | Updated question and reference text for the last answer option for Plant Pest Pressure |
| 11/9/2020 | Added paragraph on page 9 to the Overview section, clarifying the role of outside tools referred to in the reference text.  Added mineral soils to answer choice for the Subsidence Existing Condition question. |
| 12/8/2020 | Corrected hover text for Sheet and Rill Erosion question for Pasture. Adjusted question and reference text for second answer option for Plant Pest Pressure |
| 1/26/2021 | Corrected Table 34’s third bullet for the Range 51 point answer choice. Changed to read “Compaction indicator 11 is none to slight or less” rather than “…slight to moderate or less”. |
| 2/16/2021 | Table column headings in the Soil Organism Habitat Loss or Degradation and Aggregate Instability sections were updated to refer to Suitability for Aerobic Soil Organisms and the Aggregate Instability webservices, instead of the Soil Organic Matter webservice. |
| 9/1/2021 | Updates incorporated throughout by the CART Resource Concern Assessment Teams for fiscal year 2022 |
| 10/6/2021 | Corrected formatting. Deleted former Table 99 and adjusted numbering for subsequent tables (so former Table 100 is now Table 99). Updated Tables 98 and 99 (Manure, compost or biosolid application for surface and groundwater). Added footnote 11 to Table 128 (Air Quality Carbon Stock Class). Updated Table 171 (Range, Plant Pest Pressure - Invasive Species). |
| 11/4/2021 | Updated hover text for Table 187a: Livestock Feed and Forage - Pasture |
| 12/13/2021 | Updated footer on Range Table 171: Plant Pest Pressure-Invasive Species. |
| 10/1/2022 | Updates incorporated throughout by the CART Resource Concern Assessment Teams for fiscal year 2023 |
| 10/11/2022 | Corrected points on Table 90 and aligned wording in Table 104 with Table 101 (Petroleum product storage) |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

# **Overview**

NRCS conservation planners follow the nine-step conservation planning process to identify resource concerns and objectives, inventory and analyze data on resource conditions, formulate and evaluate alternatives for conservation treatment, make informed decisions, and implement and evaluate conservation plans (see the National Planning Procedures Handbook, Handbook 180, Part 600). To support the process, NRCS specialists develop methods and tools based on scientific research and modeling techniques designed for each resource concern.

The Conservation Assessment Ranking Tool (CART) streamlines existing NRCS assessment tools and methods to support NRCS conservation planners in their work with clients. CART facilitates the conservation planning process to assist conservation planners as they analyze existing resource conditions, assess site vulnerability, and formulate and evaluate alternative actions.

The NRCS conservation planning process uses planning criteria, specified for each resource concern, as a guidepost for setting conservation goals. Similarly, CART uses thresholds that represent whether planning criteria have been achieved, or, if additional conservation practices are necessary to meet them. CART also captures information to help prioritize program funding and provide a menu of financial assistance program options to support implementation.

By uniting tools already used in the conservation planning process, CART provides a streamlined framework to assess identified resource concerns. Resource concern assessment is a result of the planner’s interaction and site visit with a client. The assessment considers the client’s conservation objectives and the site’s needs. Consistent with progressive planning, a planner may choose to assess and document a subset of resource concerns. The CART assessment is designed to document identified resource concerns and estimate how existing and planned conservation practices and activities help meet NRCS planning criteria and client objectives.

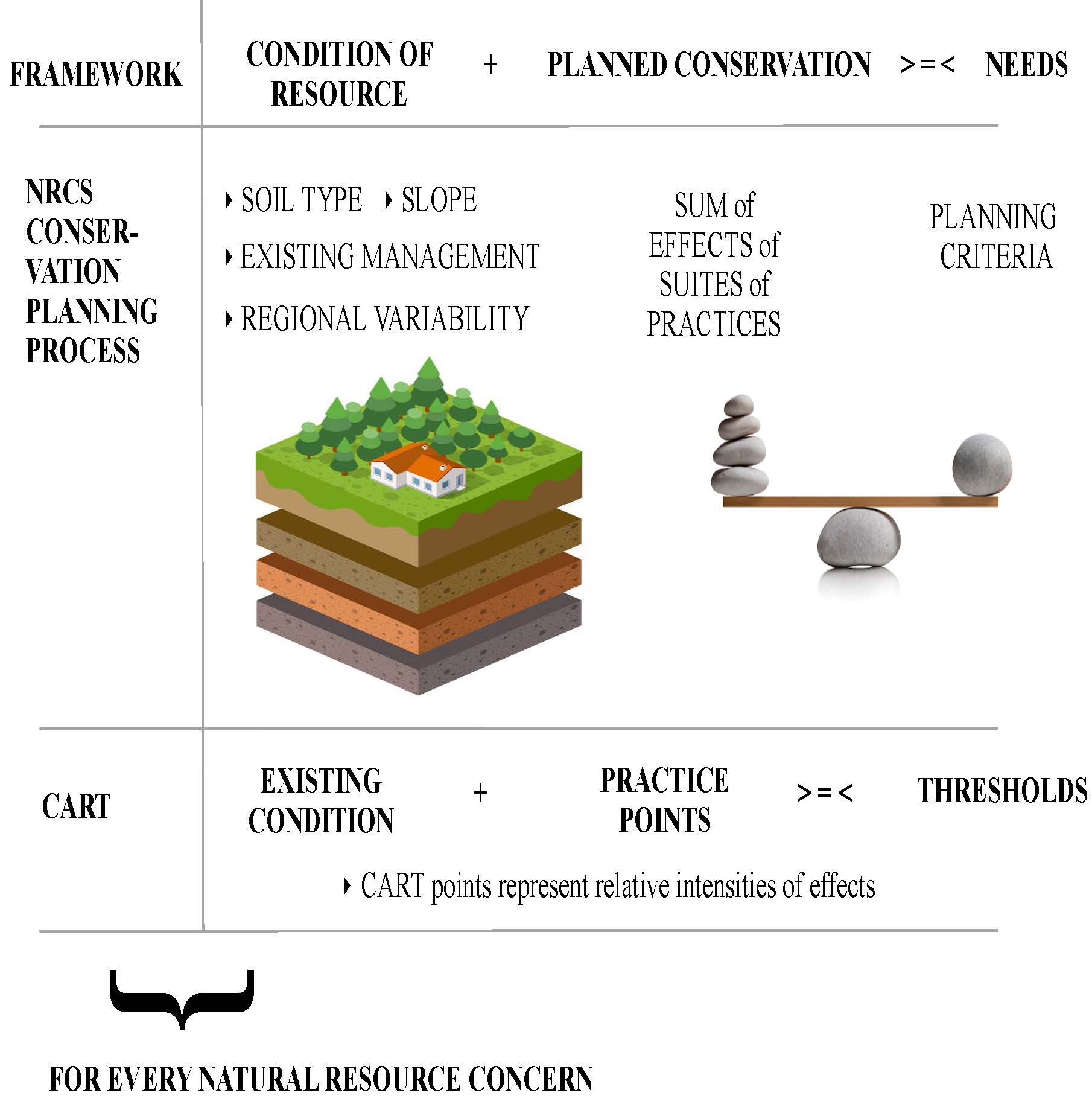
CART provides a configurable system to evaluate geospatial information along with planner-entered data. Every field is evaluated for key site characteristics that affect identified resource concerns. A threshold score is set for each identified resource concern to represent the effort needed to attain a target level of conservation using conservation actions. Sites are then evaluated for existing management and conservation efforts (the “existing condition”) and compared to the threshold to determine the level of conservation effort still needed.

CART is designed to enable the planner to override the existing and planned condition results. The override function should be used in cases when CART questions, information, and analysis framework do not align with planners’ observations, or another assessment method.

**CART METHODOLOGIES**

The goal for CART is to unite existing NRCS tools and methods that address resource concerns under a common framework by creating a system of relative points. The relative points represent effectiveness of conservation actions and can be used to compare whether current management on the land, given its unique vulnerabilities and characteristics, meets the needs of each identified resource concern, i.e. NRCS planning criteria or CART thresholds (see Figure 1). The same system enables comparisons of relative benefits of conservation actions and their relative effectiveness in treating each identified resource concern.

**Figure 1. The CART framework and its relationship to the NRCS conservation planning process.**



CART starts with the NRCS National Resource Concern List and Planning Criteria (NI 450-309.20). Each of the NRCS resource concerns has an associated land use, an objective that relates to the planning criteria, a process for evaluating the concern’s severity, and a method for establishing the planning criteria.

The sophistication and accuracy of the available tools and methods varies by resource concern. For some resource concerns, like sheet and rill erosion, tool development started nearly a century ago and has continuously progressed. Tools for estimating nutrients transported to ground and surface waters developed out of erosion computer processing models; they link several datasets to estimate conservation practice effectiveness to prevent losses of nutrients. Ephemeral and classic gully erosion rely on the observations of trained conservation professionals. To unite disparate tools, CART’s common framework uses three steps.

First, using geospatial information, planners’ observations, and/or modeling estimates, CART assists planners in undertaking a thorough evaluation of current natural resource conditions. For every resource concern that is selected, CART assigns either a fixed or a variable threshold to represent the need for conservation.

Second, CART assigns points to conservation practices[[1]](#footnote-2) to represent relative intensities of effects on identified natural resource concerns. Choosing different combinations of practices (conservation systems) allows users to estimate how analyzed alternatives impact results.

Third, within CART, planners can add current and planned management systems and evaluate them against the thresholds to assess how effective the operation’s conservation system is in meeting NRCS planning criteria. When an effective conservation system requires supporting conservation practices, the planner can add them within CART. Supporting practices will not add conservation management points to the total. A comprehensive list of practices and their points toward addressing each resource concern by land use is titled the Conservation Assessment Practice Points (CAPP) table.

The formula below shows the ideal framework for designing CART assessments for resource concerns (see Figure 1).

*When existing condition points + Planned Practice points < Threshold: resource concern exists and needs treatment*

*When existing condition points + Planned Practice points ≥ Threshold: resource concern is adequately treated*

The majority of resource concerns will have a threshold of 50, representing the NRCS planning criteria for that resource concern. If the existing condition is below 50, then the assessment threshold is not met. If the existing condition is at or above 50, then the assessment threshold is met (see Figure 1). In some cases, geospatial interpretations will be available to help set the threshold. In these situations, the variable threshold communicates a higher or lower risk or priority for the site, likely requiring additional or less conservation respectively.

**CART & “TRADITIONAL” ASSESSMENTS**

CART streamlines our existing tools and methods with a focus on capturing the key elements of the resource condition and current site management. Assessments of resource concerns in CART should closely reflect "traditional" resource assessments.

Accordingly, many of the tables in this document with CART questions, answers, and corresponding points reference the latest versions of processes outside of CART (such as the In-Field Soil Health Assessment, Pasture Condition Score, Determining Indicators of Pasture Health, Interpreting Indicators of Rangeland Health, etc.) to illustrate the shared foundations used to develop CART. The reference does not imply that an outside tool needs to be used in conjunction with CART. Indeed, in most instances, an experienced conservation planner would not need to run another tool to complete a CART assessment.

Planner knowledge, results from other assessment methods (tools, observations, client input, etc.) indicated in the NI 450, part 309.20 national planning criteria guide, recommendations available from partners and local, state, or federal policies are appropriate for use in selecting answers for CART.

| 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 water feature (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. WF that are intermittent or ephemeral streams/rivers or vernal pools should also be considered when determining if a WF is present on the PLU. These intermittent WFs should be assessed using the assessment listed under their perennial counterpart.  Note: Multiple water features can be selected. This question is required if Water Feature is selected as a land use modifier. | |
| Answer | Hover Text |
| Coastal | Includes water features that have sufficient salinity to support estuarine or marine organisms. This could include habitats such as estuaries, tidally influenced river mouths, coastal salt ponds, coastal waters, and marine open waters. Does NOT include wetlands, freshwater ponds, and non-tidal areas of rivers. NOTE: if the water feature is identified as a wetland (e.g., USFWS National Wetlands Inventory), the Wetland water feature should be selected instead of the Coastal water feature. |
| Lake or Pond | Includes vernal pools |
| River | Rivers are typically non-wadeable during normal flows, includes intermittent or ephemeral. |
| Seep |  |
| Spring |  |
| Stream | Streams are typically wadeable during normal flows, includes intermittent or ephemeral. |
| Water Conveyance Channel |  |
| Wetland | If the water feature is identified as a wetland (e.g., USFWS National Wetlands Inventory), the Wetland water feature should be selected instead of another water feature. |

|  |
| --- |
| 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*:* Are 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 |
| Honey Bees |
| Bison |
| Deer |
| Elk |
| Llamas |
| Mules |
| Rabbits |
| Turkeys |
| Alpacas |
| Emu |
| Aquacultured Fish |
| Ratites |
| Other Terrestrial Livestock |
| Other Aquacultured 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 – Select predominate crop used |
| Answer |
| Unlisted |
| 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 | 390 Other softwood group |
| 120 Spruce/Fir group | 400 Oak/Pine group |
| 140 Longleaf/Slash Pine group | 500 Oak/Hickory group |
| 150 Tropical softwoods group | 600 Oak/Gum/Cypress group |
| 160 Loblolly/Shortleaf Pine group | 700 Elm/Ash/Cottonwood group |
| 170 Other eastern softwoods group | 800 Maple/Beech/Birch group |
| 180 Pinyon/Juniper group | 900 Aspen/Birch group |
| 200 Douglas-fir group | 910 Alder/Maple group |
| 220 Ponderosa Pine group | 920 Western Oak group |
| 240 Western White Pine group | 940 Tanoak/Laurel group |
| 260 Fir/Spruce/Mountain Hemlock group | 950 Other Western Hardwoods group |
| 280 Lodgepole Pine group | 960 Other Hardwood group |
| 300 Hemlock/Sitka Spruce group | 965 Hardwood Plantation group |
| 320 Western Larch group | 970 Woodland Hardwoods group |
| 340 Redwood group | 980 Tropical Hardwoods group |
| 360 Other Western Softwood group | 988 Cloud Forest |
| 370 California Mixed Conifer group | 990 Exotic Hardwoods group |
| 380 Exotic Softwoods 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 land use**

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 Water Erodibility Potential- webservice. The webservice 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) Categorie*s.* |
| PLU Modified Erodibility Potential – Water (EIwt) |
| High (≥0.20) |
| Moderately High (≥0.10 – <0.20) |
| Moderate (≥0.05 – <0.10) |
| Low (<0.05) |

A digital map of R-Factor Classes is used in conjunction with the calculated EIwt of the dominant critical soil to set the threshold of conservation management points as indicated in Table 14. Table 15 indicates how the threshold is modified based on irrigation use.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Table 14:  *Determining Sheet and Rill Erosion Threshold* | | | | |
| PLU Modified Erodibility Potential – Water (EIwt) | R Factor Class | | | |
| Low  ≤50 | Moderate  >50-150 | Moderately High >150-250 | High >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 is asked for multiple resource concern components, as appropriate.

|  |  |  |
| --- | --- | --- |
| Table 16: *C*rop Rotation Cover/Residue/Biomass Credit | | |
| Existing Condition - Crop Rotation Credits | Sheet and Rill Erosion Points | Hover Text  Consider how the level/frequency/intensity of soil disturbance, crop types and attributes, use of cover crop, and crop rotation complexity influence conservation of soil and water. 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.  Additional State guidance may be required.  REMEMBER, points for existing and planned practices like crop rotation, cover crop and residue management are added to this system level credit. |
| None – Rapidly Depleting Soil Organic Matter | 0 | - Visible signs of erosion  - No soil cover and/or excessive soil disturbance  - Fallow (bare or chemical fallow) for significant portions of the management system  - Crops with fragile residue  - Multiple full-width tillage passes |
| Low – Depleting Soil Organic Matter | 5 | - Partial soil cover and/or periodic tillage  - Partial width or limited full-width tillage  - A mix of crops with fragile and non-fragile residue |
| Moderate – Maintaining Soil Organic Matter | 15 | - 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 |
| High – Building Soil Organic Matter | 40 | - Year-round soil cover and no tillage, or tilled infrequently during the rotation  - Crop rotations with high residue crops  - Includes cover crops or perennial crops (including hay and green manures) with full ground cover |

**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, a standard threshold of 50 is set. This component will be addressed by answering the three existing condition questions in Table 18, Table 19, and Table 20.

|  |  |  |
| --- | --- | --- |
| Table 18: *Pasture - Sheet and Rill Erosion, Plant Vigor* | | |
| Answer | Existing Condition Points | Hover text |
| High | 20 | - Rapid recovery of desirable forage. All healthy green forage.  OR  - Pasture Condition Scoresheet Plant Vigor 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.  OR  - Pasture Condition Scoresheet Plant Vigor 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.  OR  - Pasture Condition Scoresheet Plant Vigor 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.  OR  - Pasture Condition Score element Scoresheet Plant Vigor = 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.  OR  - Pasture Condition Scoresheet Plant Vigor element score = 1  OR  - DIPH Rating = Extreme to total departure for Plant Vigor Indicator #17 |

|  |  |  |
| --- | --- | --- |
| Table 19: *Pasture – Sheet and Rill Erosion, Plant Cover* | | |
| Answer | Existing Condition Points | Hover text |
| High | 20 | - Typically has more than 95% live (non-dormant) leaf canopy. Remaining is either dead standing material, or bare ground.  OR  - Pasture Condition Scoresheet - Live or Dormant Plant Cover element score = 5  OR  - DIPH Rating = None to slight departure for Live Plant Foliar Cover Indicator #12 |
| Good | 17 | - Typically has 81-95% live leaf canopy. Remaining is either dead standing material, or bare ground.  OR  - Pasture Condition Scoresheet- Live or Dormant Plant Cover element score = 4  OR  - DIPH Rating = Slight to moderate departure for Live Plant Foliar Cover Indicator #12 |
| Fair | 10 | - Typically has 66-80% live leaf canopy. Remaining is either dead standing material, or bare ground.  OR  - Pasture Condition Score Scoresheet- Live or Dormant Plant Cover element score = 3  OR  - DIPH Rating = Moderate departure for Live Plant Foliar Cover Indicator #12 |
| Low | 5 | - Typically has 40-65% is live leaf canopy Remaining is either dead standing material, or bare ground.  OR  - Pasture Condition Score Scoresheet- Live or Dormant Plant Cover element score = 2  OR  - DIPH Rating = Moderate to extreme departure for Live Plant Foliar Cover Indicator #12 |
| Poor | 1 | - Typically has less than 40% is live leaf canopy. Remaining is either dead standing material, or bare ground.  OR  - Pasture Condition Scoresheet- Live or Dormant Plant Cover element score = 1  OR  - DIPH Rating = Extreme to total departure for Live Plant Foliar Cover Indicator #12 |

|  |  |  |
| --- | --- | --- |
| Table 20: *Pasture – Sheet and Rill Erosion*  *Question Hover Text: Visual observation, Pasture Condition Score Sheet for Erosion, or Determining Indicators of Pasture Health (DIPH) for Erosion* | | |
| Answer | Existing Condition Points | Hover text |
| High | 20 | - Plant density high, no runoff, good infiltration. No evidence of present or past erosion.  OR  - Pasture Condition Scoresheet Erosion element score = 5  OR  - DIPH Rating = None to slight departure for Erosion (sheet and rill) Indicator #1 |
| Good | 17 | - Plant density high, runoff low, good infiltration. May have evidence of past erosion if present.  OR  - Pasture Condition Scoresheet Erosion element score = 4  OR  - DIPH Rating = Slight to moderate departure for Erosion (sheet and rill) Indicator #1 |
| Fair | 10 | - Plant density good and runoff moderate. If present, erosion concentrated on heavily used areas.  OR  - Pasture Condition Scoresheet Erosion element score = 3  OR  - DIPH Rating = Moderate departure for Erosion (sheet and rill) Indicator #1 |
| Low | 5 | - Plant density slows runoff. Erosion present and easily seen on steeper terrain.  OR  - Pasture Condition Scoresheet Erosion element score = 2  OR  - DIPH Rating = Moderate to extreme departure for Erosion (sheet and rill) Indicator #1 |
| Poor | 1 | - Plant density is insufficient to stop runoff and poor infiltration. Erosion easily visible throughout pasture.  OR  - Pasture Condition Scoresheet Erosion 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* | | |
| Answer | Existing Condition Points | Hover Text  Soil Site Stability AND Hydrologic Function Attributes AND Rills Indicator #1 |
| None to Slight | 50 | - |
| Slight to Moderate | 40 | - |
| Moderate | 30 | - |
| Moderate to Extreme | 15 | - |
| Extreme to Total | 1 | - |

## **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 for Crop Rotation Cover/Residue/Biomass Creditquestion will set the existing score as seen in Table 23. **Note:** This question is asked for multiple resource concern components, as appropriate.

|  |  |  |
| --- | --- | --- |
| Table 23*: Crop Rotation Cover/Residue/Biomass Credit* | | |
| Existing Condition - Crop Rotation Credits | Wind Erosion Points | Hover Text  Consider how the level/frequency/intensity of soil disturbance, crop types and attributes, use of cover crop, and crop rotation complexity influences conservation of soil and water. 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.  Additional State guidance may be required.  REMEMBER, points for existing and planned practices like crop rotation, cover crop and residue management are added to this system level credit. |
| None – Rapidly Depleting Soil Organic Matter | 0 | - Visible signs of erosion  - No soil cover and/or excessive soil disturbance  - Fallow (bare or chemical fallow) for significant portions of the management system  - Crops with fragile residue  - Multiple full-width tillage passes |
| Low – Depleting Soil Organic Matter | 5 | - Partial soil cover and/or periodic tillage  - Partial width or limited full-width tillage  - A mix of crops with fragile and non-fragile residue |
| Moderate – Maintaining Soil Organic Matter | 15 | - 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 |
| High – Building Soil Organic Matter | 40 | - Year-round soil cover and no tillage, or tilled infrequently during the rotation  - Crop rotations with high residue crops  - Includes cover crops or perennial crops (including hay and green manures) with full ground cover |

**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 Table 24.

|  |  |
| --- | --- |
| 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, a standard threshold of 50 is set. This component will be addressed by answering the existing condition questions in Table 25 and Table 26.

|  |  |  |
| --- | --- | --- |
| Table 25: *Pasture – Wind Erosion, Plant Cover* | | |
| Answer | Existing Condition Points | Hover Text |
| High | 32 | - More than 95% live (non-dormant) leaf canopy. Remaining is either dead standing material, or bare ground.  OR  - Pasture Condition Scoresheet Live or Dormant Plant Cover 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.  OR  - Pasture Condition Scoresheet Live or Dormant Plant Cover 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.  OR  - Pasture Condition Scoresheet Live or Dormant Plant Cover 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.  OR  - Pasture Condition Scoresheet Live or Dormant Plant Cover 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.  OR  - Pasture Condition Scoresheet Live or Dormant Plant Cover element score = 1  OR  - DIPH Rating = Extreme to total departure for Live Plant Foliar Cover Indicator #12 |

|  |  |  |
| --- | --- | --- |
| Table 26: *Pasture – Wind Erosion* | | |
| Answer | Existing Condition Points | Hover Text |
| High | 32 | - No wind exposed soil.  OR  - Pasture Condition Scoresheet Erosion element score = 5  OR  - DIPH Rating = None to Slight departure for Erosion Wind Scoured and/or Depositional Areas Indicator #3 |
| Good | 30 | - Minimal soil exposed, some detached vegetation wind rolled, minor plant damage.  OR  - Pasture Condition Scoresheet Erosion element score = 4  OR  - DIPH Rating = Slight to Moderate departure for Erosion Wind Scoured and/or Depositional Areas Indicator #3 |
| Fair | 26 | - Occasional wind scoured areas, litter wind rolled.  OR  - Pasture Condition Scoresheet Erosion 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.  OR  - Pasture Condition Scoresheet Erosion element score = 2  OR  - DIPH Rating = Moderate to Extreme departure for Erosion Wind Scoured and/or Depositional Areas Indicator #3 |
| Poor | 1 | - Severe wind scoured areas and deposition throughout.  Pasture Condition Scoresheet Erosion 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 | Hover text  Reference the soil/site stability limitations Interpreting Indicators of Rangeland Health (most current version) |
| None to Slight | 50 | - |
| Slight to Moderate | 40 | - |
| Moderate | 30 | - |
| Moderate to Extreme | 15 | - |
| Extreme to Total | 1 | - |

## **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 or other soil disturbance activities.

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

**Analysis within CART:**

**Crop, Pasture, Range**

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.

|  |  |
| --- | --- |
| 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.

|  |  |
| --- | --- |
| 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, storm events, wave action, rain, ice, wind, runoff, loss of vegetation, hydrologic dynamics, stream isolation from floodplains, and/or other disturbed/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.

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 1) *Element 3 Bank Condition* in the Stream Visual Assessment Protocol 2 (SVAP2) be at least moderately stable, 2) *Streambank, Shoreline indicator* in the Pasture Condition Score (PCS) be ≥ 4, or 3) the *Erosion (streambank or shoreline) indicator* in Determining Indicators of Pasture Health (DIPH) be at least Slight-to-Moderate). 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*  Hover Text: Bank erosion existing condition “Element 3 Bank condition” in SVAP2; “Streambank, Shoreline” indicator in PCS; “Erosion (streambank or shoreline)” indicator in DIPH. | | |
| Answer | Existing Condition Points | Hover Text |
| Stable | 60 | Banks are protected by roots of intact natural vegetation, wood, and rock. Minimal trampling and/or sloughing. |
| Moderately stable | 51 | Evidence of bank erosion or failures: active sloughing, downcutting, and vertical slopes are minimal; some with reestablishment of vegetation. Eroding at crossings and entrances. Hydrology of riparian system slightly altered. |
| Moderately unstable | 25 | Excessive bank erosion or active bank failures. Very little protection of banks by roots of natural vegetation, wood, or rock. Fabricated structures cover more than half of reach or entire bank. Sloughing and vertical banks active erosion. Hydrology of riparian system moderately to highly altered. |
| Unstable | 1 | Numerous active bank failures. No bank protection by roots of natural vegetation, wood, or rock. Riprap and/or other structures dominate banks. Major sloughing. Major vertical down cutting. Hydrology of riparian system severely altered. |

|  |  |  |  |
| --- | --- | --- | --- |
| *Reference for Bank Erosion Existing Condition* | | | |
| Answer | Assessment tool equivalents | | |
| [SVAP2](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_042678.pdf)  Element 3 (Bank condition) | [PCS](https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=44534.wba)  Indicator Erosion (Streambank and/or Shoreline) | DIPH  Indicator 4. Erosion (streambank or shoreline) |
| Stable | Range 9-10   * Banks are protected by roots of natural vegetation, wood, and rock * No fabricated structures * No excessive erosion or bank failures * No recreational or livestock access | 5   * Vegetation intact and stable, hardened crossings and alternative water sources used | None-to-Slight   * Bank vegetation intact, minimal trampling and/or sloughing |
| Moderately stable | Range 6-8   * Banks are protected by roots of natural vegetation, wood, or rock or a combination of materials * Limited number of structures * Evidence of erosion or bank failures, some with reestablishment of vegetation * Recreational use and/or grazing do not negatively impact bank condition | 4   * Eroding at crossings, entrances; all the bank vegetation is intact, and banks are stable | Slight-to-Moderate   * Some indication of trampled bank vegetation, active sloughing and downcutting, or vertical slopes are minimal. Hydrology of riparian system slightly altered. |
| Moderately unstable | Range 3-5   * Banks have very little protection by roots of natural wood, vegetation, or rock * Fabricated structures cover more than half of reach or entire bank * Excessive bank erosion or active failures * Recreational and/or livestock use are contributing to instability | 3   * Less than half the bank vegetation trampled; eroding at crossing/entrances   2   * More than half the bank vegetation trampled; sloughing | Moderate   * About half the bank vegetation trampled; active sloughing and downcutting. Hydrology of riparian system moderately altered.   Moderate-to-Extreme   * More than half the expected bank vegetation absent, vegetation trampled; sloughing and vertical banks with active erosion. Hydrology of riparian system highly altered. |
| Unstable | Range 0-2   * No bank protection with roots, wood, rock, or vegetation * Riprap and/or other structures dominate banks * Numerous active bank failures * Recreational and/or livestock use are contributing to instability | 1   * Banks bare, major sloughing, no bank vegetation | Extreme-to-Total   * Banks bare, major vertical downcutting, major sloughing, little or no bank vegetation. Hydrology of riparian system severely altered. |

## **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 naturally occurring 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*:* ***Dynamic Threshold*** *- Subsidence* | | |
| Answer | Subsidence Vulnerability Points | Hover Text (Definitions) |
| 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 |
| Subsidence does not occur because soils are mineral, or 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.

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

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, 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*:* ***Dynamic Threshold*** *- Compaction* | | |
| Answer | Threshold | Hover Text |
| 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 | Hover Text |
| Compaction is significant | 0 | **All Applicable Land Uses**   * Evidence of compaction, such as ponding, stunted plant growth, or root growth limitation is observed. State-specific examples will be useful.   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.   Options for Range   * Interpreting Indicators of Rangeland Health (IIRH) Soil/Site Stability attribute: slight to moderate or less   AND   * IIRH Hydrologic Function attribute: slight to moderate or less   OR   * IIRH Compaction Layer Indicator 11: slight to moderate or less   Options for 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 | **All Applicable Land Uses**   * 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.   Options for Range   * Interpreting Indicators of Rangeland Health indicates: * Soil Site Stability is slight to moderate or less   AND   * Hydrologic Function is slight to moderate or less   OR   * Compaction Indicator 11 is none to slight or less.   OR   * No observed evidence of compaction, such as ponding, stunted plant growth, or root growth limitation.   Options for 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, and water and nutrient cycling.

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

**Analysis within CART:**

**Associated Agriculture Land, Crop, Developed Land, 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 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*:* ***Dynamic 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 OR Organic matter depletion moderate) | 50 |
| Soil highly capable of accumulating organic matter  (webservice ratings = Organic matter depletion moderately low OR 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 | | | Question Hover Text |
| **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 OR Organic matter depletion moderate | **Soil highly**  **capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low OR Organic matter depletion low | In-Field Soil Health Assessment indicators for OM Depletion:  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. |
| Hover Text | | | | |
| None – Extensively Depleted Soil Organic Matter | 0 | 0 | 0 | * If using IFSHA results - 2 or fewer of the In-Field Soil Health Assessment indicators listed in the question’s hover text meet the assessment criteria |
| Low – Degraded Soil Organic Matter | 0 | 1 | 6 | * If using IFSHA results - 3 of the In-Field Soil Health Assessment indicators listed in the question’s hover text meet the assessment criteria |
| Moderate – Reduced Levels of Soil Organic Matter | 1 | 6 | 11 | * If using IFSHA results - 4 of the In-Field Soil Health Assessment indicators listed in the question’s hover text meet the assessment criteria |
| High – Soil Organic Matter is at or Exceeds Potential for the Site | 61 | 51 | 41 | * If using IFSHA results - 5 or more of the In-Field Soil Health Assessment indicators listed in the question’s hover text meet the assessment criteria |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Forest, Developed Land, Associated Agriculture Land, Other Rural Land** | | | | |
| Table 37*: Existing Condition - Organic Matter Depletion, Various Land Uses* | | | | |
| Answer | Existing Condition Points | | | Hover Text |
| **Soil barely capable of accumulating SOM**  Soil webservice rating = Organic Matter Depletion High | **Soil moderately capable of accumulating SOM**  Soil webservice rating = Organic matter depletion moderately high OR Organic matter depletion moderate | **Soil highly  capable of accumulating SOM**  Soil webservice rating = Organic matter depletion moderately low OR Organic matter depletion low |
| None – Extensively Depleted Soil Organic Matter | 0 | 0 | 0 | * 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. |
| Low – Degraded Soil Organic Matter | 0 | 1 | 6 | * 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. |
| Moderate – Reduced Levels of Soil Organic Matter | 1 | 6 | 11 | * 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. |
| High – Soil Organic Matter is at or Exceeds Potential for the Site | 61 | 51 | 41 | * 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. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Range** | | | | |
| Table 38*: Existing Condition - Organic Matter Depletion, Range* | | | | |
| Answer | Existing Condition Points | | | Hover Text |
| **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 OR Organic matter depletion moderate | **Soil highly**  **capable of accumulating SOM**  webservice rating = Organic matter depletion moderately low OR Organic matter depletion low |  |
| None – Extensively Depleted Soil Organic Matter | 0 | 0 | 0 | * Interpreting Indicators of Rangeland Health – Soil Surface Loss and Degradation Indicator 9 departure is Extreme to Total |
| Low – Degraded Soil Organic Matter | 0 | 1 | 6 | * 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 |
| Moderate – Reduced Levels of Soil Organic Matter | 1 | 6 | 11 | * 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 |
| High – Soil Organic Matter is at or Exceeds Potential for the Site | 61 | 51 | 41 | * Interpreting Indicators of Rangeland Health – Soil Surface Loss and Degradation Indicator 9 departure is None to Slight. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pasture** | | | | |
| Table 39*: Existing Condition - Organic Matter Depletion, Pasture* | | | | |
| Answer | Existing Condition Points | | | Hover Text |
| **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 OR Organic matter depletion moderate | **Soil highly capable of accumulating  SOM**  webservice rating = Organic matter depletion moderately low OR Organic matter depletion low |
| None – Extensively Depleted Soil Organic Matter | 0 | 0 | 0 | * PCS Live or Dormant Plant Cover element score is 1 or lower.   AND   * Plant Residue and Litter as Soil Cover element score is 1 or lower.   AND   * Plant Diversity by Dry Weight element score is 1 or lower.   OR   * Determining Indicators of Pasture Health – Soil Surface Loss and Degradation Indicator 10 departure is Extreme to Total |
| Low - Degraded Soil Organic Matter | 0 | 1 | 6 | * PCS Live or Dormant Plant Cover element score is 2.   AND   * Plant Residue and Litter as Soil Cover element score is 2.   AND   * Plant Diversity by Dry Weight element score is 2.   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 |
| Moderate - Reduced Levels of Soil Organic Matter | 1 | 6 | 11 | * 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 – 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. |
| High – Soil Organic Matter is at or Exceeds Potential for the Site | 61 | 51 | 41 | * 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 – Soil Surface Loss and Degradation Indicator 10 departure is None to Slight. |

## **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 | Hover Text |
| Excessive salt/chemical concentration in soil | 1 | * Observation of mineral crust on the soil surface.   OR   * Soil or irrigation water test 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.   OR   * PLU is identified as contributing to saline or sodic seep area |
| No excessive salt/chemical concentration in soil | 51 | * No evidence of existing salinity/sodicity problem   OR   * Soil or irrigation water test 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 what is expected for the ecological site description |

## **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 (SOH-Limitations for Aerobic Soil Organisms, <https://jneme910.github.io/CART/chapters/Limitations_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 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 45, and Table 46. 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 |
| Very limited | 60 |
| Somewhat limited | 50 |
| Not limited | 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 and Associated Agricultural Land**

Existing condition points are based on the combination of the soil’s inherent limitations 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 and Associated Ag. Land* | | | | |
| Answer | Existing Condition Points | | | Hover Text |
| **webservice soil rating  Very limited** | **webservice soil rating Somewhat limited** | **webservice soil rating Not limited** | In-Field Soil Health Assessment indicators for Soil Organism Habitat:  - 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. |
| None – Extensively Depleted Soil Organism Habitat | 0 | 0 | 0 | * If using IFSHA results - 2 or fewer of the In-Field Soil Health Assessment indicators listed in the question’s hover text meet the assessment criteria. |
| Low – Depleted Soil Organism Habitat | 0 | 1 | 6 | * If using IFSHA results - 3 of the In-Field Soil Health Assessment indicators listed in the question’s hover text meet the assessment criteria. |
| Moderate – Diminished Soil Organism Habitat | 1 | 6 | 11 | * If using IFSHA results - 4 of the In-Field Soil Health Assessment indicators listed in the question’s hover text meet the assessment criteria. |
| High – Soil Organism Habitat Extensive and contains all required components | 61 | 51 | 41 | * If using IFSHA results – 5 or more of the In-Field Soil Health Assessment indicators listed in the question’s hover text meet the assessment criteria. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Developed Land, Forest, Other Rural Land**  Table 44*: Existing Condition -* *Soil Organism Habitat Loss or Degradation, Various Land Uses* | | | | |
| Answer | Existing Condition Points | | | Hover Text |
| **webservice soil rating  Very limited** | **webservice soil rating Somewhat limited** | **webservice soil rating Not limited** |
| None – Extensively Depleted Soil Organism Habitat | 0 | 0 | 0 | * 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. |
| Low –Degraded Soil Organism Habitat | 0 | 1 | 6 | * 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. |
| Moderate – Diminished Soil Organism Habitat | 1 | 6 | 11 | * 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. |
| High – Soil Organism Habitat Extensive and contains all required components | 61 | 51 | 41 | * 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. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pasture**  Table 45*: Existing Condition - Soil Organism Habitat Loss or Degradation, Pasture* | | | | |
| Answer | Existing Condition Points | | | Hover Text |
| **webservice soil rating  Very limited** | **webservice soil rating Somewhat limited** | **webservice soil rating Not limited** |
| None – Extensively Depleted Soil Organism Habitat | 0 | 0 | 0 | * PCS Live or Dormant Plant Cover element score is 1.   AND   * Plant Residue and Litter as Soil Cover element score is 1.   AND   * Plant Diversity by Dry Weight element score is 1.   AND   * Soil Regenerative Features element is 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 |
| Low – Degraded Soil Organism Habitat | 0 | 1 | 6 | * PCS Live or Dormant Plant Cover element score is 2.   AND   * Plant Residue and Litter as Soil Cover element score is 2.   AND   * Plant Diversity by Dry Weight element score is 2.   AND   * Soil Regenerative Features element is 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. |
| Moderate – Diminished Soil Organism Habitat | 1 | 6 | 11 | * 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.   AND   * Soil Regenerative Features element is 3.   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 |
| High – Soil Organism Habitat Extensive and contains all required components | 61 | 51 | 41 | * 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.   AND  - Soil Regenerative Features element is >4.  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 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Range**  Table 46*: Existing Condition - Soil Organism Habitat Loss or Degradation, Range* | | | | |
| Answer | Existing Condition Points | | | Hover Text |
| **webservice soil rating  Very limited** | **webservice soil rating Somewhat limited** | **webservice soil rating Not limited** |
| None – Extensively Depleted Soil Organism Habitat | 0 | 0 | 0 | * Interpreting Indicators of Rangeland Health – Soil/Site Stability, Hydrologic Function, and Biotic Integrity Attribute departures range from Moderate to Extreme, to Extreme to Total |
| Low – Degraded Soil Organism Habitat | 0 | 1 | 6 | * 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 |
| Moderate – Diminished Soil Organism Habitat | 1 | 6 | 11 | * 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 |
| High – Soil Organism Habitat Extensive and contains all required components | 61 | 51 | 41 | * 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 |

## **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, Forest, Other Rural Land, Pasture, Range**

If the planner selects this resource concern component for assessment, a Soil Data Access (Agricultural Aggregate Stability 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 50, and Table 51. 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 OR Moderately 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 and Associated Ag. Land**

Existing condition points are based on a combination of the soil’s inherent suitability for aggregate stability with the cropping management system’s influence on aggregate stability.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Table 48*: Existing Condition - Aggregate Instability, Cropland and Associated Ag. Land* | | | | |
| Answer | Existing Condition Points | | | Question Hover Text   * In-Field Soil Health Assessment indicators for Aggregate Instability: * 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 |
| **Inherent soil aggregate stability is weak**  webservice rating =  Low | **Inherent soil aggregate stability is moderate**  webservice rating =  Moderate or Moderately High | **Inherent soil aggregate stability is High**  webservice rating =  High |
| Hover Text | | | | |
| None – Soil Surface aggregation non-existent | 0 | 0 | 0 | * If using IFSHA results, answer No to all the In-Field Soil Health Assessment indicators relating to this resource concern. |
| Low – Aggregate Stability very weak | 0 | 1 | 6 | * If using IFSHA results, answer No to the water stable aggregates (Cylinder) indicator AND yes to 1 or 2 of the other indicators relating to this resource concern. |
| Moderate – Maintain Stable Aggregates under low to moderate stressors | 1 | 6 | 11 | * If using IFSHA results, answer yes to the water stable aggregates (Cylinder) indicator AND yes to 2 or 3 of the other indicators relating to this resource concern. |
| High – Aggregate Stability very strong and at Potential for the Site | 61 | 51 | 41 | * If using IFSHA results, answer yes to the water stable aggregates (Cylinder) indicator AND yes to more than 3 or more of the other indicators relating to this resource concern. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Developed Land, Forest, Other Rural Land**  Table 49*: Existing Condition - Aggregate Instability, Various Land Uses* | | | | |
| Answer | Existing Condition Points | | | Hover Text |
| **Inherent soil aggregate stability is weak**  webservice rating = Low | **Inherent soil aggregate stability is moderate**  webservice rating =  Moderate or Moderately High | **Inherent soil aggregate stability is High**  webservice rating = High |
| None – Soil Surface aggregation non-existent | 0 | 0 | 0 | * 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. |
| Low – Aggregate Stability very weak | 0 | 1 | 6 | * 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. |
| Moderate – Maintain Stable Aggregates under low to moderate stressors | 1 | 6 | 11 | * 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. |
| High – Aggregate Stability very strong and at Potential for the Site | 61 | 51 | 41 | * 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. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pasture** | | | | |
| Table 50: *Existing Condition – Aggregate Instability, Pasture* | | | | |
| Answer | Existing Condition Points | | | Hover Text |
| **Inherent soil aggregate stability is weak**  webservice rating = Low | **Inherent soil aggregate stability is moderate**  webservice rating =  Moderate or Moderately High | **Inherent soil aggregate stability is High**  webservice rating = High |
| None – Soil Surface aggregation non-existent  to Total | 0 | 0 | 0 | * 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 |
| Low – Aggregate Stability very weak | 0 | 1 | 6 | * 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 |
| Moderate – Maintaining Stable Aggregates under low to moderate stressors | 1 | 6 | 11 | * PCS Soil Condition and Regenerative Features score = 3.   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 |
| High – Aggregate Stability very strong and at Potential for the Site | 61 | 51 | 41 | * PCS Soil Condition and Regenerative Features score = >4.   OR   * Determining Indicators of Pasture Health – All three of the Attributes (Soil/Site Stability, Hydrologic Function, and Biotic Integrity) are None to Slight departure |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Range**  Table 51*: Existing Condition - Aggregate Instability, Range* | | | | |
| Answer | Existing Condition Points | | | Hover Text |
| **Inherent soil aggregate stability is weak**  webservice rating =  Low | **Inherent soil aggregate stability is moderate**  webservice rating = Moderate or Moderately High | **Inherent soil aggregate stability is High**  webservice rating = High |
| None – Soil Surface aggregation non-existent | 0 | 0 | 0 | * Interpreting Indicators of Rangeland Health – Soil Surface Resistance to Erosion Indicator 8 departure is Extreme to Total |
| Low – Aggregate Stability very weak | 0 | 1 | 6 | * 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 |
| Moderate – Maintain Stable Aggregates under low to moderate stressors | 1 | 6 | 11 | * 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 |
| High – Aggregate Stability very strong and at Potential for the Site | 61 | 51 | 41 | * Interpreting Indicators of Rangeland Health – Soil Surface Resistance to Erosion Indicator 8 departure is None to Slight |

# **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 |

**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 |

**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.

|  |  |
| --- | --- |
| 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 |

**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; OR Accumulation is not taking place in strategic locations that are 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; OR planner or client can document that retention or accumulation of snow in strategic locations beneficial to the enterprise. | 51 |

**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 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 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, minimize evaporation, and reduce runoff 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 | Hover Text |
| 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   OR   * Determining Indicators of Pasture Health Hydrologic Function attributes are None to Slight Departure |
| 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   OR   * Determining Indicators of Pasture Health Hydrologic Function attributes are Slight to Moderate Departure |
| 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   OR   * Determining Indicators of Pasture Health Hydrologic Function attributes are Moderate Departure |
| 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   OR   * Determining Indicators of Pasture Health Hydrologic Function attributes are Moderate to Extreme Departure |
| 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   OR   * Determining Indicators of Pasture Health Hydrologic Function attributes are Extreme to Total Departure |

|  |  |  |
| --- | --- | --- |
| 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 | Hover Text |
| 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 Attribute Rating* | | |
| Answer | Existing Condition Points | Hover Text |
| 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, 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**

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 | Hydrologic Soil Group | | | |
| 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 | Hydrologic Soil Group | | | |
| 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 | Dual Hydrologic Soil Group | | |
|  | 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**  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 | Hover Text |
| No nutrients, currently or historically, applied | 100 for P 90 for N | * No organic or inorganic nutrients are, or have been, historically 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 currently or have been historically applied | 0 | * Organic or inorganic nutrients are, or have been, applied to the PLU mechanically or by hand. |

**Follow on questions for Crop and Pasture Below. Assessment for all other land uses stops with the question of nutrients applied or not applied.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Crop**  Table 69*: Existing Condition - Cover/Residue/Biomass Crop Rotation Credit* | | | |
| Existing Condition - Crop Rotation Credits | Nitrogen Runoff Existing Condition Points | Phosphorus Runoff Existing Condition Points | Hover Text  Consider how the level/frequency/intensity of soil disturbance, crop types and attributes, use of cover crop, and crop rotation complexity influences conservation of soil and water. 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.  Additional State guidance may be required.  REMEMBER, points for existing and planned practices like crop rotation, cover crop and residue management are added to this system level credit. |
| None – Rapidly Depleting Soil Organic Matter | 0 | 0 | - Visible signs of erosion  - No soil cover and/or excessive soil disturbance  - Fallow (bare or chemical fallow) for significant portions of the management system  - Crops with fragile residue  - Multiple full-width tillage passes |
| Low – Depleting Soil Organic Matter | 2 | 5 | - Partial soil cover and/or periodic tillage  - Partial width or limited full-width tillage  - A mix of crops with fragile and non-fragile residue |
| Moderate – Maintaining Soil Organic Matter | 5 | 10 | - 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 |
| High – Building Soil Organic Matter | 10 | 15 | - Year-round soil cover and no tillage, or tilled infrequently during the rotation  - Crop rotations with high residue crops  - Includes cover crops or perennial crops (including hay and green manures) with full ground cover |

|  |  |  |  |
| --- | --- | --- | --- |
| **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 | Hover Text |
| 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) | Hydrologic Soil Group | | | |
| 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 | Hover Text |
| No nutrients currently or historically applied | 51 for N and 55 for P | * No organic or inorganic nutrients are or have been historically 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 currently or have been historically applied | 0 | * Organic or inorganic nutrients are or are have been applied to the PLU mechanically or by hand. |

**Follow on questions for Crop and Pasture Below. Assessment for all other land uses stops with the question of nutrients applied or not applied.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Crop**  Table 75*: Existing Condition - Cover/Residue/Biomass Crop Rotation Credit* | | | | |
| Existing Condition - Crop Rotation Credits | Nitrogen Leaching Existing Condition Points | Phosphorus Leaching Existing Condition Points | Hover Text  Consider how the level/frequency/intensity of soil disturbance, crop types and attributes, use of cover crop, and crop rotation complexity influences conservation of soil and water. 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.  Additional State guidance may be required.  REMEMBER, points for existing and planned practices like crop rotation, cover crop and residue management are added to this system level credit. |
| None – Rapidly Depleting Soil Organic Matter | 0 | 0 | - Visible signs of erosion  - No soil cover and/or excessive soil disturbance  - Fallow (bare or chemical fallow) for significant portions of the management system  - Crops with fragile residue  - Multiple full-width tillage passes |
| Low – Depleting Soil Organic Matter | 2 | 2 | - Partial soil cover and/or periodic tillage  - Partial width or limited full-width tillage  - A mix of crops with fragile and non-fragile residue |
| Moderate – Maintaining Soil Organic Matter | 5 | 5 | - 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 |
| High – Building Soil Organic Matter | 10 | 10 | - Year-round soil cover and no tillage, or tilled infrequently during the rotation  - Crop rotations with high residue crops  - Includes cover crops or perennial crops (including hay and green manures) with full ground cover |

|  |  |  |  |
| --- | --- | --- | --- |
| **Pasture**  Table 76: *Pasture – Erosion*  *Question Hover Text: Pasture Condition Score* | | | |
| Answer | Nitrogen Leaching Loss Existing Condition Points | Phosphorus Leaching Loss Existing Condition Points | Hover Text |
| 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, this includes waste from processing chickens and oysters, etc) | |
| Answer | Existing Condition Points |
| 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 |
| 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 |
| Solid or Liquid material storage – contained and fully functional | 51 |
| Solid or Liquid material storage - not contained | 1 |
| Liquid or mixed material storage – contained but not fully functional | 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 |
| 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 |
| Solid or Liquid material storage – contained and fully functional | 51 |
| Solid or Liquid material storage - not contained | 1 |
| Liquid or mixed material storage – contained but not fully functional | 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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. The R factor class result will be matrixed with the acre weighted average soil rating for the PLU. If the service is not available, the user will manually answer the question in CART.

|  |  |  |
| --- | --- | --- |
| 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 Pesticide Use and Risk category choice.

|  |  |  |  |
| --- | --- | --- | --- |
| Table 86*: Pesticide Use and Risk – Cropland, nonpoint pesticide loss to water* | | | |
| Answer |  | Existing Condition Score Dry Climate | Existing Condition Score Humid Climate |
| 1. Unknown risk or fallow (High risk) |  | 1 | 1 |
| 2. Orchards, vineyards, berries and nut crops (High risk) |  | 1 | 1 |
| 3. Vegetable Crops (High risk) |  | 1 | 1 |
| 4. Cotton (High risk) |  | 1 | 1 |
| 5. Seed crops (High risk) |  | 1 | 1 |
| 6. Flooded rice and cranberry crops (High risk) |  | 1 | 1 |
| 7. Turfgrass for sod and nursery crops (High risk) |  | 1 | 1 |
| 8. Close grown crops - residue not harvested (Moderate risk) |  | 10 | 20 |
| 9. Close grown crops – residue removed (Moderate risk) |  | 10 | 20 |
| 10. Row crops – durable residue not harvested (Moderate risk) |  | 10 | 20 |
| 11. Row crops - residue removed or fragile (Moderate risk) |  | 10 | 20 |
| 12. Christmas trees (Moderate risk) |  | 10 | 20 |
| 13. Hay crops - forage (Low risk) |  | 15 | 30 |

|  |  |  |
| --- | --- | --- |
| Table 87*: Existing Condition - Cover/Residue/Biomass Crop Rotation Credit* | | |
| Existing Condition - Crop Rotation Credits. | Pesticide Runoff Points | Question Hover Text  Consider how the level/frequency/intensity of soil disturbance, crop types and attributes, use of cover crop, and crop rotation complexity influences conservation of soil and water. 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.  Additional State guidance may be required.  REMEMBER, points for existing and planned practices like crop rotation, cover crop and residue management are added to this system level credit. |
| None – Rapidly Depleting Soil Organic Matter | 0 | - Visible signs of erosion  - No soil cover and/or excessive soil disturbance  - Fallow (bare or chemical fallow) for significant portions of the management system  - Crops with fragile residue  - Multiple full-width tillage passes |
| Low – Depleting Soil Organic Matter | 10 | - Partial soil cover and/or periodic tillage  - Partial width or limited full-width tillage  - A mix of crops with fragile and non-fragile residue |
| Moderate – Maintaining Soil Organic Matter | 20 | - 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 |
| High – Building Soil Organic Matter | 30 | - Year-round soil cover and no tillage, or tilled infrequently during the rotation  - Crop rotations with high residue crops  - Includes cover crops or perennial crops (including hay and green manures) with full ground cover |

|  |  |  |
| --- | --- | --- |
| Non-Cropland: Associated Agriculture Land, Developed Land, Farmstead, Forest, Other Rural Land, Pasture, Range, Water  Table 88*:*  *Pesticide Use and Risk - non-Cropland* | | |
| Answer | Existing Condition Score  Dry Climate | Existing Condition Score  Humid Climate |
| Low | 15 | 30 |
| None | 30 | 60 |

|  |  |  |
| --- | --- | --- |
| **Crop, Forest, Pasture, Range, Farmstead, Developed Land, Other Rural Land, Associated Ag Land**  Table 89*:* *Pest Management System – Mitigating Pesticide Loss to Surface Water*  Note: What kind of Pest Management (PM) System is implemented on the PLU to manage pests and pesticide environmental risk? | | |
| Answer | Existing Condition Points | Hover Text |
| Pesticides are used, but an IPM system is not utilized; and pesticide losses to surface water are NOT addressed. | 1 |  |
|  |  |  |
| The risk mitigation is equivalent to Pest Management Conservation System (595). | 25 | Based on WIN-PST results or Planner's appropriate local knowledge and experience. The use of 595 needs to be recorded as an Existing Practice in this Assessment. |

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

**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 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.

|  |  |  |
| --- | --- | --- |
| **Associated Agriculture Land, Crop, Forest, Developed Land, Farmstead, Pasture, Range, Other Rural Land**  Table 90*: Pest Management System – Mitigating Pesticide Drift to Surface Water*  Note: What kind of Pest Management (PM) System is implemented on the PLU to manage pests and pesticide environmental risk? | | |
| Answer | Existing Condition Points | Hover Text |
| 1. Pesticides are used, but an IPM system is not utilized; pesticide drift losses are NOT addressed. | 1 |  |
|  |  |  |
| The level of risk management is equivalent to Pest Management Conservation System (595). | 5 | There is Drift risk, but it is being mitigated. The use of 595 needs to be recorded as an Existing Practice in this Assessment. |

## **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.

|  |  |  |
| --- | --- | --- |
| Table 91*: 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 Pesticide Use and Risk category choice.

|  |  |  |
| --- | --- | --- |
| Table 92*: Pesticide Use and Risk – Cropland, nonpoint pesticide loss to water* | | |
| Answer | Existing Condition Score Dry Climate | Existing Condition Score Humid Climate |
| 1. Unknown risk or fallow (High risk) | 1 | 1 |
| 2. Orchards, vineyards, berries and nut crops (High risk) | 1 | 1 |
| 3. Vegetable Crops (High risk) | 1 | 1 |
| 4. Cotton (High risk) | 1 | 1 |
| 5. Seed crops (High risk) | 1 | 1 |
| 6. Flooded rice and cranberry crops (High risk) | 1 | 1 |
| 7. Turfgrass for sod and nursery crops (High risk) | 1 | 1 |
| 8. Close grown crops - residue not harvested (Moderate risk) | 10 | 20 |
| 9. Close grown crops – residue removed (Moderate risk) | 10 | 20 |
| 10. Row crops – durable residue not harvested (Moderate risk) | 10 | 20 |
| 11. Row crops - residue removed or fragile (Moderate risk) | 10 | 20 |
| 12. Christmas trees (Moderate risk) | 10 | 20 |
| 13. Hay crops - forage (Low risk) | 15 | 30 |

|  |  |  |
| --- | --- | --- |
| Table 93*: Existing Condition - Cover/Residue/Biomass Crop Rotation Credit* | | |
| Existing Condition - Crop Rotation Credits | Pesticide Leaching Points | Question Hover Text  Consider how the level/frequency/intensity of soil disturbance, crop types and attributes, use of cover crop, and crop rotation complexity influences conservation of soil and water. 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.  Additional State guidance may be required.  REMEMBER, points for existing and planned practices like crop rotation, cover crop and residue management are added to this system level credit. |
| None – Rapidly Depleting Soil Organic Matter | 0 | - Visible signs of erosion  - No soil cover and/or excessive soil disturbance  - Fallow (bare or chemical fallow) for significant portions of the management system  - Crops with fragile residue  - Multiple full-width tillage passes |
| Low – Depleting Soil Organic Matter | 5 | - Partial soil cover and/or periodic tillage  - Partial width or limited full-width tillage  - A mix of crops with fragile and non-fragile residue |
| Moderate – Maintaining Soil Organic Matter | 10 | - 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 |
| High – Building Soil Organic Matter | 15 | - Year-round soil cover and no tillage, or tilled infrequently during the rotation  - Crop rotations with high residue crops  - Includes cover crops or perennial crops (including hay and green manures) with full ground cover |

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

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 94*:*  *Pesticide Use and Risk 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 95*: Pest Management System – Mitigating Pesticide Loss to groundwater*  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 | Hover Text |
| Pesticides are used, but an IPM system is not utilized; and pesticide leaching losses to groundwater are NOT addressed. | 1 |  |
|  |  |  |
| The risk mitigation is equivalent to Pest Management Conservation System (595). | 20 | Based on WIN-PST results or Planner's appropriate local knowledge and experience. The use of 595 needs to be recorded as an Existing Practice in this Assessment. |

## **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 or food wastes and other organic wastes, 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**

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. A tile drained field will be considered here in Table 96 as a surface water resource concern. The existing condition question will set the existing score as seen in Table 96. 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 96*: Manure, compost or biosolid application*  *Question hover text: Risk of surface waters receiving pathogens, pharmaceuticals, and chemicals from land applied manure, biosolids, or compost* | | |
| Risk Level | Existing Condition Points | Hover Text |
| Low - No surface water near site of land application OR setbacks from sensitive areas (from sinkholes, wells, water courses, wetlands, open tile inlets) according to nutrient management plan and sediment trapping protecting sensitive areas OR application method incorporates or injects within 24 hours of application OR tile drainage water management plus incorporation with incorporation/injection within 24 hours of application. | 50 | Relates to 590 directly |
| Medium - Surface water adjacent to area of land application; field has tile drainage without open inlets; sheet and rill erosion is below T; wind erosion is controlled. | 26 | Existing/ observed 590 plus residue and tillage, filter strips, veg barriers, buffers |
| High - Surface water adjacent to area of land application; no treatment of waste for pathogens prior to application; field has tile drainage with open inlets; no application setback. | 0 | No observation/existing 590 |

## **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 or food wastes and other organic wastes, 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**

The planner will identify this resource concern based on site specific conditions. A tile drained field will be considered a surface water resource concern (see Table 96). 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 97. 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, including any appropriate setbacks, will be required from appropriate conservation practices and activities, that address pathogens and manage livestock waste 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 97*: Manure, compost or biosolid application*  *Question hover text:* *Risk of pathogens, pharmaceuticals, and chemicals from land applied manure, biosolids, or compost transferred to groundwater.* | | |
| Risk Level | Existing Condition Points | Hover Text |
| Low - Application of waste at agronomic rates with setback from a well, sinkhole or conduit to groundwater (appropriate for location). low leaching potential. | 50 | Relates to 590 directly. |
| Medium - Application of waste at agronomic rates, seasonal high water table; compost treatment has reduced pathogen load; permeable soils; application without regard for setback from conduits to groundwater (sinkholes, well, fractured bedrock). | 26 | Application of waste at agronomic rates but no setback from conduits to groundwater (sinkholes, well, fractured bedrock). |
| High - Application without regard for setback from conduits to groundwater (sinkholes, well, fractured bedrock), liquid application of manure and biosolids; no waste treatment for pathogens prior to application. | 0 | Vulnerable groundwater with no waste treatment for pathogens. |

## **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, Water**

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 98*: Salt Loss to Surface Water* | |
| Answer | Existing Condition Points |
| No | 60 |
| Yes - is NOT currently being managed | 0 |
| Yes - 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 infiltration 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, Water**

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 99*: Salt Loss to Groundwater* | |
| Answer | Existing Condition Points |
| No | 60 |
| Yes - is NOT currently being managed | 0 |
| Yes - is being managed with the irrigation water management or drainage 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**

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 100.

|  |  |
| --- | --- |
| Table 100*: Agrichemical Product Storage (Pesticides and Fertilizers)*  Note: Are agrichemical products stored, mixed, loaded, or handled on the PLU? | |
| Answer | Existing Condition Points |
| 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: Storage of petroleum or other pollutant containment to surface water

**Description:** Petroleum products >1000 gallons or lesser storage with leakage risk are stored and handled on site or lesser storage with spillage risk without on-farm secondary containment facility where one would be needed (catchment that 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 activities including storage and handling. Materials containing these pollutant types are stored or handled on site, and 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**

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 101.

|  |  |
| --- | --- |
| Table 101*: Petroleum* *products stored and handled on the PLU* | |
| Answer | Existing Condition Points |
| Yes - ARE stored and handled on the PLU, but secondary containment is **NOT** in place or is non-functional. | 0 |
| Yes - ARE stored and handled on the PLU and secondary containment IS in place that meets the minimum assessment threshold. | 51 |

### Component 3: Heavy metals or other pollutants - surface water

**Description:** The planner will identify this resource concern based on site-specific conditions. Contaminated areas (heavy metals for example) including urban agriculture sites on the PLU have the potential to contaminate surface waters, including heavy metals or other pollutants. Accumulations of industrial or mining waste and other materials containing pollutants are present, generated, released, stored or handled on site, so they have the potential to contaminate surface waters.

**Objective:** Control the release of accumulated heavy metals or other pollutants such as industrial or mining waste to prevent contamination of surface waters.

**Analysis within CART:**

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

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 102.

|  |  |
| --- | --- |
| Table 102*: Heavy Metals or Other Pollutants Present on the PLU* | |
| Answer | Existing Condition Points |
| 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 from 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 that would catch and prevent incidental spillage).

**Analysis within CART:**

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

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*: Agrichemical Product Storage (Pesticides and Fertilizers)*  Note: Are agrichemical products stored, mixed, loaded, or handled on the PLU? | |
| Answer | Existing Condition Points |
| 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: Storage of petroleum or other pollutant containment to groundwater

**Description:** Petroleum products >1000 gallons or lesser storage with leakage risk are stored and handled on site or lesser storage with spillage risk without on-farm secondary containment facility where one would be needed (catchment that would catch and prevent incidental leakage), so the potential exists to contaminate groundwater. As well, heavy metals or other pollutants are present on the PLU from 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**

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*:* Petroleum products stored and handled on the PLU | |
| Answer | Existing Condition Points |
| Yes - ARE stored and handled on the PLU, but secondary containment is **NOT** in place or is non-functional. | 0 |
| Yes - ARE stored and handled on the PLU and secondary containment IS in place that meets the minimum assessment threshold. | 51 |

### Component 3: Heavy metals or other pollutants- - groundwater

**Description:** The planner will identify this resource concern based on site-specific conditions. Contaminated areas (heavy metals for examples) including urban agriculture sites on the PLU have the potential to contaminate groundwater, including heavy metals or other ~~mining effluent~~ pollutants. Accumulations of industrial or mining waste and other materials containing pollutants are present, generated, released, stored or handled on site, so they have the potential to contaminate groundwater.

**Objective:** Control release of accumulated heavy metals or other pollutants such as industrial or mining waste 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 105 below.

|  |  |
| --- | --- |
| Table 105*: Heavy metals and other pollutants Present on the PLU* | |
| Answer | Existing Condition Points |
| 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 106, Table 107, and Table 108. The acre weighted average rating for the PLU is then determined based on ratings for each soil map unit in the PLU.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Table 106*: 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 107*: 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 108*:* *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 109.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Table 109*: 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 110.

|  |  |  |
| --- | --- | --- |
| Table 110*: Existing Rotation Residue Value* | | |
| Existing Condition - Crop Rotation Credits | Sediment from Erosion Credit Points | Question Hover Text  Consider how the level/frequency/intensity of soil disturbance, crop types and attributes, use of cover crop, and crop rotation complexity influences conservation of soil and water. 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.  Additional State guidance may be required.  REMEMBER, points for existing and planned practices like crop rotation, cover crop and residue management are added to this system level credit. |
| None – Rapidly Depleting Soil Organic Matter | 0 | - Visible signs of erosion  - No soil cover and/or excessive soil disturbance  - Fallow (bare or chemical fallow) for significant portions of the management system  - Crops with fragile residue  - Multiple full-width tillage passes |
| Low – Depleting Soil Organic Matter | 10 | - Partial soil cover and/or periodic tillage  - Partial width or limited full-width tillage  - A mix of crops with fragile and non-fragile residue |
| Moderate – Maintaining Soil Organic Matter | 20 | - 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 |
| High – Building Soil Organic Matter | 40 | - Year-round soil cover and no tillage, or tilled infrequently during the rotation  - Crop rotations with high residue crops  - Includes cover crops or perennial crops (including hay and green manures) with full ground cover |

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 111.

|  |  |
| --- | --- |
| Table 111: *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 112, Table 113, and

Table 114.

|  |  |  |  |
| --- | --- | --- | --- |
| Table 112: *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 | Hover Text |
| 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 113: *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 | | Hover Text |
| 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 114: *Pasture – Erosion*  *Question Hover Text: Pasture Condition Score Sheet for Erosion OR Determining Indicators of Pasture Health (DIPH) for Erosion* | | | |
| Answer | Existing Condition Points | | Hover Text |
| 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 115.

|  |  |  |
| --- | --- | --- |
| Table 115: *Rangeland Health - Soil/Site Stability Limitations* | | |
| Answer | Existing Condition Points | Hover Text |
| 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**

**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, oxides of

nitrogen, and volatile organic compounds – can cause multiple negative environmental impacts.

### Component 1: PM – diesel engines

**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.

The existing condition question will set the existing condition score as seen in Table 116. **Note:** This question is asked for multiple resource concern components, as appropriate. If there are no diesel engines in operation at the PLU, this component is not applicable.

|  |  |  |
| --- | --- | --- |
| Table 116*: 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. When evaluating this resource concern component, also consider evaluating Energy Efficiency of Equipment and Facilities and Energy Efficiency of Field Operations.* | | |
| Answer | Existing Condition Points | Hover Text |
| 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-diesel engine combustion equipment

**Objective:** 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 117. **Note:** This question is asked for multiple resource concern components, as appropriate. If there are no non-diesel engine combustion sources in operation at the PLU, this component is not applicable.  Table 117*: Non-Diesel Engine Combustion Sources* *Existing Condition*  *Question Hover Text: If there are no non-diesel engine combustion sources in operation at the PLU, this component is not applicable. Otherwise, document all non-diesel engine combustion sources, including heat input rating, fuel type, and annual hours of usage. When evaluating this resource concern component, also consider evaluating Energy Efficiency of Equipment and Facilities and Energy Efficiency of Field Operations.* | | |
| Answer | Existing Condition Points | Hover Text |
| 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 * Additional 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:** Both of the following are true:   * 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:** Both of the following are true:   * 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

**Objective:** 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 118. **Note:** This question is asked for multiple resource concern components, as appropriate. If fire is not applied at the PLU, this component is not applicable.

|  |  |
| --- | --- |
| Table 118*: Are you using fire for management of landscapes or piled biomass?*  *Question Hover Text: If fire is not applied at the PLU, this component is not applicable.* | |
| Answer | Existing Condition Points |
| 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). Link to the Basic Smoke Management Practices Technical Note: <https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046311.pdf>.

### Component 4: PM – pesticide drift

**Objective:** Emissions of PM from pesticide use do 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. **Note:** The pesticide use question is asked for multiple resource concern components, as appropriate. If there is no chemical pesticide application at the PLU, this component is not applicable.

|  |  |  |
| --- | --- | --- |
| Table 119*:* *Pesticide Application to Reduce Spray Drift*  *Question Hover Text: Is the client doing anything to address spray drift?* | | |
| Answer | Existing Condition Points | Hover Text |
| Pesticides are applied according to a full IPM system for efficient production and environmental protection. | 5 | 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. IMPORTANT: Since a full IPM System meets the requirements of CPS 595, document it in the Existing Practices to receive full credit. |
| Pesticides are applied and spray drift is minimized. | 51 | Pesticides are applied according to label guidance to manage pests (including invasive plants) and to meet production needs, and pesticide drift is minimized with drift reducing spray technologies or techniques. |
| Pesticides are applied without measures that mitigate spray drift. | 1 | Pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs. No additional mitigation for spray drift is utilized. |

### Component 5: PM – nitrogen fertilizer

**Objective:** 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 120. **Note:** This question is asked for multiple resource concern components, as appropriate. If there is no nitrogen fertilizer application at the PLU, this component is not applicable.

|  |  |  |
| --- | --- | --- |
| Table 120*: Nitrogen Fertilizer Application – Nitrogen Impacts to Air Quality*  *Question Hover Text: If there is no nitrogen fertilizer application at the PLU, this component is not applicable and should not be selected. Includes all nitrogen (including manure, inorganic fertilizer, and organic fertilizer) applied mechanically or by hand. Does NOT include nitrogen deposited by grazing animals when this is the only nitrogen applied. When evaluating this resource concern component, also consider evaluating Nutrients Transported to Surface Water – Nonpoint Nitrogen Surface Loss and Nutrients Transported to Groundwater – Nonpoint Nitrogen Leaching Loss.* | | |
| Answer | Existing Condition Points | Hover Text |
| Nitrogen fertilizer is applied and a nutrient management plan that addresses nitrogen is utilized | 5 | Nitrogen (including manure, inorganic fertilizer, and organic fertilizer) is applied to the PLU mechanically or by hand. Since a nutrient management plan that addresses nitrogen is utilized, document it in the Observed Existing Practices to receive credit. |
| Nitrogen fertilizer is applied, and no nutrient management plan exists | 1 | Nitrogen (including manure, inorganic fertilizer, and organic fertilizer) is applied to the PLU mechanically or by hand. There is no existing nutrient management plan that addresses nitrogen. |

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. If you enter Nutrient Management (590) as an Observed Existing Practice, do not schedule it as a Planned Practice unless it is a “higher-tier” narrative for implementation of Nutrient Management (590).

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

**Objective:** 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, 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.

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 121.

|  |  |  |
| --- | --- | --- |
| Table 121*:* *Dust from Field Operations*  *Question Hover Text: If there are no field operations (e.g., tillage, harvesting, etc.) conducted at the PLU, this component is not applicable. 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 | Hover Text |
| Minimal potential for dust | 51 | Neither the Planner or client has observed any PM/dust issues related to field operations at the PLU |
| Moderate potential for dust | 5 | Planner or client has observed PM/dust issues related to field operations and practices have been applied (document practices in the Observed Existing Practices to receive credit). |
| Significant potential for dust | 1 | Planner or client has observed PM/dust issues related to field operations at the PLU and practices have not been applied to address these issues. |

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

**Objective:** 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, 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.

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

|  |  |  |
| --- | --- | --- |
| Table 122*: 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 | Hover Text |
| 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. |
| Moderate potential for dust | 5 | Planner or client has observed PM/dust issues related to vehicle travel on unpaved roads and practices have been applied (document practices in the Observed Existing Practices to receive credit). |
| Significant potential for dust | 1 | Planner or client has observed PM/dust issues related to vehicle travel on unpaved roads at the PLU and practices have not been applied to address these issues. |

### Component 8: PM – windblown dust

**Objective:** 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 123*: 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? When evaluating this resource concern component, also consider evaluating Wind Erosion. If wind erosion has been identified as a resource concern at the PLU, select “Moderate potential for dust” or “Significant potential for dust”.* | | |
| Answer | Existing Condition Points | Hover Text |
| Minimal potential for dust | 51 | Neither the Planner or client has observed any windblown PM/dust issues at the PLU. |
| Moderate potential for dust | 5 | Planner or client has observed windblown PM/dust issues at the PLU and practices have been applied (document practices in the Observed Existing Practices to receive credit). |
| Significant potential for dust | 1 | Planner or client has observed windblown PM/dust issues at the PLU and practices have not been applied to address these issues. |

### Component 9: PM – confined animal activities

**Objective:** 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 124. **Note:** This question is asked for multiple resource concern components, as appropriate.

|  |  |  |
| --- | --- | --- |
| Table 124*: Dust from Confinement-Based Animal Operations*  *Question Hover Text: 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? If only grazing livestock are present on the PLU (i.e., no confinement), this component is not applicable.* | | |
| Answer | Existing Condition Points | Hover Text |
| 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. |
| Moderate potential for dust | 5 | Planner or client has observed PM/dust issues related to confinement-based animal production at the PLU and practices have been applied (document practices in the Observed Existing Practices to receive credit). |
| Significant potential for dust | 1 | Planner or client has observed PM/dust issues related to confinement-based animal production at the PLU and practices have not been applied to address these issues. |

Reference for addressing an identified resource concern for dust from confinement-based animal operations: naqsat.tamu.edu

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

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

### Component 1: GHGs – nitrogen fertilizer

**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 125. **Note:** This question is asked for multiple resource concern components, as appropriate. If there is no nitrogen fertilizer application at the PLU, this component is not applicable.

|  |  |  |
| --- | --- | --- |
| Table 125*: Nitrogen Fertilizer Application – Nitrogen Impacts to Air Quality*  *Question Hover Text: If there is no nitrogen fertilizer application at the PLU, this component is not applicable. Includes all nitrogen (including manure, inorganic fertilizer, and organic fertilizer) applied mechanically or by hand. Does NOT include nitrogen deposited by grazing animals when this is the only nitrogen applied. When evaluating this resource concern component, also consider evaluating Nutrients Transported to Surface Water – Nonpoint Nitrogen Surface Loss and Nutrients Transported to Groundwater – Nonpoint Nitrogen Leaching Loss.* | | |
| Answer | Existing Condition Points | Hover Text |
| Nitrogen fertilizer is applied and a nutrient management plan that addresses nitrogen is utilized | 5 | Nitrogen (including manure, inorganic fertilizer, and organic fertilizer) is applied to the PLU mechanically or by hand. Since a nutrient management plan that addresses nitrogen is utilized, document it in the Observed Existing Practices to receive credit. |
| Nitrogen fertilizer is applied, and no nutrient management plan exists | 1 | Nitrogen (including manure, inorganic fertilizer, and organic fertilizer) is applied to the PLU mechanically or by hand. There is no existing nutrient management plan that addresses nitrogen. |

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. If you enter Nutrient Management (590) as an Observed Existing Practice, do not schedule it as a Planned Practice unless it is a “higher-tier” narrative for implementation of Nutrient Management (590).

### Component 2: GHGs – carbon stock

**Objective:** 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**

If the planner selects this resource concern component for assessment, two Soil Data Access (Agricultural Organic Matter Depletion Interpretation, <https://jneme910.github.io/CART/chapters/Organic_Matter_Depletion> and Soil Organic Carbon Stocks Interpretation, <https://jneme910.github.io/CART/chapters/Soil_Organic_Carbon_Stock>) will be used to determine the percentage of soils susceptible to organic matter depletion and the percentage of soils in each soil organic carbon stock potential class, respectively, in the PLU. These webservices utilize the NRCS published soils database (SSURGO). These webservice requests are used to determine the carbon stock class, as shown in Table 126. Once the carbon stock class is determined, the threshold is set based on Table 127.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 126*: Carbon Stock Class* | | | | | |
|  | **Soil Carbon Depletion Risk** | | | | |
| **Carbon Sequestration Potential** | Low1 | Moderately Low2 | Moderate3 | Moderately High4 | High5 |
| Very Low6 | 1 | 1 | 1 | 1 | 2 |
| Low7 | 1 | 1 | 1 | 2 | 2 |
| Moderate8 | 1 | 1 | 2 | 2 | 2 |
| Moderately High9 | 1 | 2 | 2 | 2 | 3 |
| High10 | 2 | 2 | 2 | 3 | 3 |
| Any Undrained Hydric or Undrained Organic Soils11 | 3 | 3 | 3 | 3 | 3 |

1 Low soil carbon depletion risk means that the soils in the PLU have an organic matter depletion rating no higher than Moderately Low. When the PLU is less than 20 acres, less than 20% of the area is rated Moderately Low. Otherwise, less than 10 acres or 10% of the area in the PLU (whichever is lower) is rated Moderately Low.

2 Moderately Low soil carbon depletion risk means that the soils in the PLU have an organic matter depletion rating no higher than Moderate. When the PLU is less than 20 acres, less than 20% of the area is rated Moderate. Otherwise, less than 10 acres or 10% of the area in the PLU (whichever is lower) is rated Moderate.

3 Moderate soil carbon depletion risk means that the soils in the PLU have an organic matter depletion rating no higher than Moderately High. When the PLU is less than 20 acres, less than 20% of the area is rated Moderately High. Otherwise, less than 10 acres or 10% of the area in the PLU (whichever is lower) is rated Moderately High.

4 Moderately High soil carbon depletion risk means that, when the PLU is less than 20 acres, less than 20% of the soils in the PLU have an organic matter depletion rating of High. Otherwise, less than 10 acres or 10% of the area in the PLU (whichever is lower) is rated High.

5 High soil carbon depletion risk means that, when the PLU is less than 20 acres, at least 20% of the soils in the PLU have an organic matter depletion rating of High. Otherwise, at least 10 acres or 10% of the area in the PLU (whichever is greater) is rated High.

6 Very Low carbon sequestration potential means that the soils in the PLU have a soil organic carbon stock rating no higher than Low. When the PLU is less than 20 acres, less than 20% of the area is rated Low. Otherwise, less than 10 acres or 10% of the area in the PLU (whichever is lower) is rated Low.

7 Low carbon sequestration potential means that the soils in the PLU have a soil organic carbon stock rating no higher than Moderate. When the PLU is less than 20 acres, less than 20% of the area is rated Moderate. Otherwise, less than 10 acres or 10% of the area in the PLU (whichever is lower) is rated Moderate.

8 Moderate carbon sequestration potential means that the soils in the PLU have a soil organic carbon stock rating no higher than Moderately High. When the PLU is less than 20 acres, less than 20% of the area is rated Moderately High. Otherwise, less than 10 acres or 10% of the area in the PLU (whichever is lower) is rated Moderately High.

9 Moderately High carbon sequestration potential means that, when the PLU is less than 20 acres, less than 20% of the soils in the PLU have a soil organic carbon stock rating of High. Otherwise, less than 10 acres or 10% of the area in the PLU (whichever is lower) is rated High.

10 High carbon sequestration potential means that, when the PLU is less than 20 acres, at least 20% of the soils in the PLU have a soil organic carbon stock rating of High. Otherwise, at least 10 acres or 10% of the area in the PLU (whichever is greater) is rated High.

11 There is an easements hydric flag that will be turned on if 50% or greater of the planned land unit are hydric (easement not required).

|  |  |
| --- | --- |
| Table 127*: Threshold – Carbon Stock, Crop, Associated Agriculture Land* | |
| **Carbon Stock Class** | **Threshold** |
| Class 1 | 50 |
| Class 2 | 75 |
| Class 3 | 90 |

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 an estimate of the potential for maintaining or accumulating and retaining carbon stock in soils and biomass.

|  |  |  |
| --- | --- | --- |
| Table 128: *Existing Condition – Carbon Stock, Cropland*  *Question Hover Text: Are carbon stocks stable or increasing at the PLU? When evaluating this resource concern component, also consider evaluating Organic Matter Depletion.* | | |
| Answer | Existing Condition Points | Hover Text |
| None – Depleted Carbon Stock | 0 | Answer yes to **2 or less** of the In-Field Soil Health Assessment indicators relating to this resource concern:   1. Surface cover from plants, residue or mulch: cover greater than 75%. 2. Natural decomposition of crop residues is as expected with crop and conditions. 3. Granular soil structure in A horizon and no platy structure in A or B horizons. 4. 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. 5. Clearly evident; more than 3 different types of organisms observed without magnification. 6. Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. |
| Low – Degraded Carbon Stock | 10 | Answer yes to **3** of the In-Field Soil Health Assessment indicators relating to this resource concern:   1. Surface cover from plants, residue or mulch: cover greater than 75%. 2. Natural decomposition of crop residues is as expected with crop and conditions. 3. Granular soil structure in A horizon and no platy structure in A or B horizons. 4. 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. 5. Clearly evident; more than 3 different types of organisms observed without magnification. 6. Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. |
| Moderate – Improved Carbon Stock | 51 | Answer yes to **4** of the In-Field Soil Health Assessment indicators relating to this resource concern   1. Surface cover from plants, residue or mulch: cover greater than 75%. 2. Natural decomposition of crop residues is as expected with crop and conditions. 3. 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. 4. Granular soil structure in A horizon and no platy structure in A or B horizons. 5. 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. 6. Clearly evident; more than 3 different types of organisms observed without magnification. 7. Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. |
| High – Adequate Carbon Stock | 76 | Answer yes to **5 or more** of the In-Field Soil Health Assessment indicators relating to this resource concern:   1. Surface cover from plants, residue or mulch: cover greater than 75%. 2. Natural decomposition of crop residues is as expected with crop and conditions. 3. 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. 4. Granular soil structure in A horizon and no platy structure in A or B horizons. 5. 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. 6. Clearly evident; more than 3 different types of organisms observed without magnification. 7. Presence of root or earthworm channels that extend vertically through the soil with some connecting to the surface. |
| Maximum – Perennial Cover with No Soil Disturbance | 95 | Perennial vegetative cover maintained, and no soil disturbance activities conducted |

|  |  |  |
| --- | --- | --- |
| **Associated Agriculture Land**  Table 129*: Existing Condition – Carbon Stock, Associated Agriculture Land*  *Question Hover Text: Are carbon stocks stable or increasing at the PLU? When evaluating this resource concern component, also consider evaluating Organic Matter Depletion. 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.* | | |
| Answer | Existing Condition Points | Hover Text |
| None – Depleted Carbon Stock | 0 | * Living vegetation is absent or very sparse. * Plant litter, soil biological crust, and woody debris are absent or very sparse. |
| Low – Degraded Carbon Stock | 10 | * 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. |
| Moderate – Improved Carbon Stock | 51 | * 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. |
| High – Adequate Carbon Stock | 76 | * 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. |
| Maximum – No Soil Disturbance | 95 | * 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.  There are no soil disturbance activities. |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Pasture**  A threshold value will be set at 50 and the following existing condition questions will be triggered.  Table 130*: Existing Condition – Carbon Stock, Pasture*  *Question Hover Text: Are carbon stocks stable or increasing at the PLU? When evaluating this resource concern component, also consider evaluating Organic Matter Depletion.* *The lowest rating in Pasture Condition Score for any of the indicators (Dormant Plant Cover, Plant Residue and Litter or Plant Diversity) or the most departed rating in Determining Indicators of Pasture Health for any of the attributes (Soil/Site Stability, Biotic Integrity or Hydrologic Function) or Indicator 9 (Soil Surface Loss and Degradation) sets the answer for the resource concern.*   |  |  |  | | --- | --- | --- | | Answer | Existing Condition Points | Hover Text | | None – Depleted Carbon Stock | 0 | * PCS Live or Dormant Plant Cover element score is **1** or lower.   AND   * Plant Residue and Litter as Soil Cover element score is **1** or lower.   AND   * Plant Diversity by Dry Weight element score is **1** or lower.   -OR-   * Determining Indicators of Pasture Health – Any of the three attributes (Soil/Site Stability, Biotic Integrity or Hydrologic Function) departures are Extreme to Total.   OR   * Soil Surface Loss and Degradation Indicator **9** departure is Extreme to Total. | | Low – Degraded Carbon Stock | 10 | * PCS Live or Dormant Plant Cover element score is **2**.   AND   * Plant Residue and Litter as Soil Cover element score is **2**.   AND   * Plant Diversity by Dry Weight element score is **2**   -OR-   * Determining Indicators of Pasture Health-Any of the three attributes (Soil/Site Stability, Biotic Integrity or Hydrologic Function) departures are Moderate to Extreme,   OR   * Soil Surface Loss and Degradation Indicator **9** departure is Moderate to Extreme. | | Moderate – Improved Carbon Stock | 25 | * 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- Any of the three attributes (Soil/Site Stability, Biotic Integrity or Hydrologic Function) departures are moderate  -OR-   * Soil Surface Loss and Degradation Indicator **9** departure is Moderate. | | High – Adequate Carbon Stock | 51 | * 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 of the three attributes (Soil/Site Stability, Biotic Integrity or Hydrologic Function) departure are slight to moderate  -OR-   * Soil Surface Loss and Degradation Indicator **9** departure is Slight to Moderate. | | Maximum-No Disturbance Carbon Stock | 75 | * 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** of the three attributes (Soil/Site Stability, Biotic Integrity or Hydrologic Function) departure are None to Slight   -OR-   * Soil Surface Loss and Degradation, Indicator **9** departure is None to Slight. | |
| **Range**  A threshold value will be set at 50 and the following existing condition questions will be triggered.  Table 131*: Existing Condition – Carbon Stock, Range*  *Question Hover Text: Are carbon stocks stable or increasing at the PLU? When evaluating this resource concern component, also consider evaluating Organic Matter Depletion. The most departed rating for any of the attributes (Soil/Site Stability, Biotic Integrity or Hydrologic Function) or Indicator 9 (Soil Surface Loss and Degradation) sets the answer for the resource concern.*   |  |  |  | | --- | --- | --- | | Answer | Existing Condition Points | Hover Text | | None – Depleted Carbon Stock | 0 | * Interpreting Indicators of Rangeland Health- Any of the three attributes (Soil/Site Stability, Biotic Integrity or Hydrologic Function) departure are Extreme to Total   - OR-   * Soil Surface Loss and Degradation Indicator **9** departure is Extreme to Total. | | Low – Degraded Carbon Stock | 10 | * Interpreting Indicators of Rangeland Health- Any of the three attributes (Soil/Site Stability, Biotic Integrity or Hydrologic Function) departure are Moderate to Extreme   - OR-   * Soil Surface Loss and Degradation Indicator **9** departure is Moderate to Extreme. | | Moderate – Improved Carbon Stock | 25 | * Interpreting Indicators of Rangeland Health- Any of the three attributes (Soil/Site Stability, Biotic Integrity or Hydrologic Function) departure are Moderate.   - OR-   * Soil Surface Loss and Degradation Indicator **9** departure is Moderate. | | High – Adequate Carbon Stock | 51 | * Interpreting Indicators of Rangeland Health- Any of the three attributes (Soil/Site Stability, Biotic Integrity or Hydrologic Function) departure are Slight to Moderate.   - OR-   * Soil Surface Loss and Degradation Indicator **9** departure is Slight to Moderate. | | Maximum – No Soil Disturbance Carbon Stock | 75 | * Interpreting Indicators of Rangeland Health- Any of the three attributes (Soil/Site Stability, Biotic Integrity or Hydrologic Function) departure are None to Slight.   - OR-   * Soil Surface Loss and Degradation Indicator **9** departure is None to Slight. | |

**Forest**

A threshold value will be set at 50 and the following existing condition questions will be triggered.

|  |  |
| --- | --- |
| Table 132*: Existing Condition – Carbon Stock, Forest*  *Question Hover Text: Are carbon stocks stable or increasing at the PLU? When evaluating this resource concern component, also consider evaluating Organic Matter Depletion.* | |
| Answer | Existing Condition Points |
| Overstocked Stand, Not Managed | 1 |
| Overstocked Stand, Managed | 25 |
| Fully-Stocked or Understocked Stand, Not Managed | 51 |
| Fully-Stocked or Understocked Stand, Managed | 75 |

### Component 3: GHGs – confined animal activities

**Objective:**  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 133 and Table 134. **Note:** The manure management question is asked for multiple resource concern components, as appropriate.

|  |  |  |
| --- | --- | --- |
| Table 133: *Manure Management*  *Question Hover Text: In what form is manure managed at the PLU? If only grazing livestock are present at the PLU (i.e., no confinement), this component is not applicable. When evaluating this resource concern component, also consider evaluating Nutrients Transported to Surface Water – Concentrated Nutrient and Pathogen Surface Loss from Storage and Handling of Manure, Compost, Biosolids, or Non-Ag Food Waste and Nutrients Transported to Groundwater – Concentrated Nutrient and Pathogen Leaching Loss from Storage and Handling of Manure, Compost, Biosolids, or Non-Ag Food Waste.* | | |
| Answer | Existing Condition Points | Hover Text |
| Only solid manure | 1 | There is only solid manure managed at the PLU. If the solid manure is stored under some form of rain exclusion cover to reduce moisture addition, document it in the Observed Existing Practices to receive credit. |
| Liquid or slurry manure or any combination of solid manure with liquid or slurry | 1 | Liquid or slurry manure or any combination of solid manure with liquid or slurry is stored at the PLU. If the manure is treated in an anaerobic digester or an aerobic manure treatment system, or if the manure is stored under a cover, document it in the Observed Existing Practices to receive credit. |

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 134*: Feed Management Plan or Strategy*  *Question Hover Text: If only grazing livestock are present at the PLU (i.e., no confinement), this component is not applicable.* | | |
| Answer | Existing Condition Points | Hover Text |
| Livestock are present and a feed management plan is utilized to manage nitrogen and/or enteric methane emissions | 5 | Since a feed management plan is utilized, document it in the Observed Existing Practices to receive credit. |
| Livestock are present, and no feed management plan to manage nitrogen and/or enteric methane emissions exists | 1 | Livestock are present at the PLU, but there is no existing feed management plan or strategy that addresses nitrogen and/or enteric methane emissions. |

If there is no NRCS-approved feed management plan or strategy that specifically addresses enteric methane emissions and nitrogen excretion, apply Feed Management (592) to develop such a plan. If you enter Feed Management (592) as an Observed Existing Practice, do not schedule it as a Planned Practice.

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

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

### Component 1: Ozone – diesel engines

**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.

The existing condition question will set the existing condition score as seen in Table 135. **Note:** This question is asked for multiple resource concern components, as appropriate. If there are no diesel engines in operation at the PLU, this component is not applicable.

|  |  |  |
| --- | --- | --- |
| Table 135*: 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. When evaluating this resource concern component, also consider evaluating Energy Efficiency of Equipment and Facilities and Energy Efficiency of Field Operations.* | | |
| Answer | Existing Condition Points | Hover Text |
| 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-diesel engine combustion equipment

**Objective:** 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 136. **Note:** This question is asked for multiple resource concern components, as appropriate. If there are no non-diesel engine combustion sources in operation at the PLU, this component is not applicable.

|  |  |  |
| --- | --- | --- |
| Table 136*: Non-Diesel Engine Combustion Sources Existing Condition*  *Question Hover Text: If there are no non-diesel engine combustion sources in operation at the PLU, this component is not applicable. Otherwise, document all non-diesel engine combustion sources, including heat input rating, fuel type, and annual hours of usage. When evaluating this resource concern component, also consider evaluating Energy Efficiency of Equipment and Facilities and Energy Efficiency of Field Operations.* | | |
| Answer | Existing Condition Points | Hover Text |
| 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 * Additional 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:** Both of the following are true:   * 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:** Both of the following are true:   * 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

**Objectives:** 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. **Note:** This question is asked for multiple resource concern components, as appropriate. If fire is not applied at the PLU, this component is not applicable.

|  |  |
| --- | --- |
| Table 137*: Are you using fire for management of landscapes or piled biomass?*  *Question Hover Text: If fire is not applied at the PLU, this component is not applicable.* | |
| Answer | Existing Condition Points |
| 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). Link to the Basic Smoke Management Practices Technical Note: <https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046311.pdf>.

### Component 4: Ozone – pesticide VOCs

**Objectives:** 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 138*: Ozone Pesticide Application Threshold Values***. The threshold value will apply to cover both fumigant and non-fumigant pesticide requirements.

|  |  |
| --- | --- |
| Table 138*: 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. **Note:** The pesticide use question is asked for multiple resource concern components, as appropriate.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | | Table 139*:* *Pesticide Application to Reduce Volatilization*  *Question Hover Text: Is the client doing anything to address pesticide volatilization?* | | | | Answer | Existing Condition Points | Hover Text | | Pesticides are applied according to a full IPM system for efficient production and environmental protection. | 5 | 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. Since a full IPM System meets the requirements of CPS 595, document it in the Existing Practices to receive full credit. | | Pesticides are applied and volatilization is minimized. | 51 | Pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs, and pesticide volatilization is minimized with alternative formulations or other VOC-reducing techniques. | | Pesticides are applied without measures that mitigate volatilization. | 1 | Pesticides are applied according to label guidance to manage pests (including invasive plants) to meet production needs. No additional mitigation for volatilization is utilized. | |

### Component 5: Ozone – confined animal activities

**Objectives:** 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 140. **Note:** This question is asked for multiple resource concern components, as appropriate.

|  |  |  |
| --- | --- | --- |
| Table 140*: Manure Management*  *Question Hover Text: In what form is manure managed at the PLU? If only grazing livestock are present at the PLU (i.e., no confinement), this component is not applicable.* | | |
| Answer | Existing Condition Points | Hover Text |
| Only solid manure | 1 | There is only solid manure managed at the PLU. If the solid manure is stored under some form of rain exclusion cover to reduce moisture addition, document it in the Observed Existing Practices to receive credit. |
| Liquid or slurry manure or any combination of solid manure with liquid or slurry | 1 | Liquid or slurry manure or any combination of solid manure with liquid or slurry is stored at the PLU. If the manure is treated in an anaerobic digester or an aerobic manure treatment system, or if the manure is stored under a cover, document it in the Observed Existing Practices to receive credit. |

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)**

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

### Component 1: Odor – nitrogen fertilizer

**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 141. **Note:** This question is asked for multiple resource concern components, as appropriate. If there is no nitrogen fertilizer application at the PLU, this component is not applicable.

|  |  |  |
| --- | --- | --- |
| Table 141*: Nitrogen Fertilizer Application – Nitrogen Impacts to Air Quality*  *Question Hover Text: If there is no nitrogen fertilizer application at the PLU, this component is not applicable. Includes all nitrogen (including manure, inorganic fertilizer, and organic fertilizer) applied mechanically or by hand. Does NOT include nitrogen deposited by grazing animals when this is the only nitrogen applied. When evaluating this resource concern component, also consider evaluating Nutrients Transported to Surface Water – Nonpoint Nitrogen Surface Loss and Nutrients Transported to Groundwater – Nonpoint Nitrogen Leaching Loss.* | | |
| Answer | Existing Condition Points | Hover Text |
| Nitrogen fertilizer is applied and a nutrient management plan that addresses nitrogen is utilized | 5 | Nitrogen (including manure, inorganic fertilizer, and organic fertilizer) is applied to the PLU mechanically or by hand. Since a nutrient management plan that addresses nitrogen is utilized, document it in the Observed Existing Practices to receive credit. |
| Nitrogen fertilizer is applied, and no nutrient management plan exists | 1 | Nitrogen (including manure, inorganic fertilizer, and organic fertilizer) is applied to the PLU mechanically or by hand. There is no existing nutrient management plan that addresses nitrogen. |

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. If you enter Nutrient Management (590) as an Observed Existing Practice, do not schedule it as a Planned Practice unless it is a “higher-tier” narrative for implementation of Nutrient Management (590).

### Component 2: Odor – confined animal activities

**Objective:** 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 142.

|  |  |  |
| --- | --- | --- |
| Table 142*: 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? If only grazing livestock are present at the PLU (i.e., no confinement), this component is not applicable.* | | |
| Answer | Existing Condition Points | Hover Text |
| Minimal potential for odor | 51 | Neither the Planner or client has observed any odor issues related to confinement-based animal production at the PLU. |
| Moderate potential for odor | 5 | Planner or client has observed odor issues related to confinement-based animal production at the PLU and practices have been applied (document practices in the Observed Existing Practices to receive credit). |
| Significant potential for odor | 1 | Planner or client has observed odor issues related to confinement-based animal production at the PLU and practices have not been applied to address these issues. |

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)**

**Description:** Emissions of airborne reactive nitrogen - ammonia and oxides of nitrogen – can negatively impact atmospheric chemistry, cause unwanted fertilization via deposition in sensitive ecosystems, and degrade regional visibility.

### Component 1: Reactive nitrogen – diesel engines

**Objective:** Emissions of airborne reactive nitrogen from diesel engines 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 question will be triggered.

The existing condition question will set the existing condition score as seen in Table 143. **Note:** This question is asked for multiple resource concern components, as appropriate. If there are no diesel engines in operation at the PLU, this component is not applicable.

|  |  |  |
| --- | --- | --- |
| Table 143*: 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. When evaluating this resource concern component, also consider evaluating Energy Efficiency of Equipment and Facilities and Energy Efficiency of Field Operations.* | | |
| Answer | Existing Condition Points | Hover Text |
| 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-diesel engine combustion equipment

**Objective:** 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 144. **Note:** This question is asked for multiple resource concern components, as appropriate. If there are no non-diesel engine combustion sources in operation at the PLU, this component is not applicable.

|  |  |  |
| --- | --- | --- |
| Table 144*: Non-Diesel Engine Combustion Sources Existing Condition*  *Question Hover Text: If there are no non-diesel engine combustion sources in operation at the PLU, this component is not applicable. Otherwise, document all non-diesel engine combustion sources, including heat input rating, fuel type, and annual hours of usage. When evaluating this resource concern component, also consider evaluating Energy Efficiency of Equipment and Facilities and Energy Efficiency of Field Operations.* | | |
| Answer | Existing Condition Points | Hover Text |
| 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 * Additional 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 | Both of the following must be true:   * 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

**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. **Note:** This question is asked for multiple resource concern components, as appropriate. If fire is not applied at the PLU, this component is not applicable.

|  |  |
| --- | --- |
| Table 145*: Are you using fire for management of landscapes or piled biomass?*  *Question Hover Text: If fire is not applied at the PLU, this component is not applicable.* | |
| Answer | Existing Condition Points |
| 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). Link to the Basic Smoke Management Practices Technical Note: <https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046311.pdf>.

### Component 4: Reactive nitrogen – nitrogen fertilizer

**Objective:** 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 146. **Note:** This question is asked for multiple resource concern components, as appropriate.

|  |  |  |
| --- | --- | --- |
| Table 146*: Nitrogen Fertilizer Application – Nitrogen Impacts to Air Quality*  *Question Hover Text: If there is no nitrogen fertilizer application at the PLU, this component is not applicable. Includes all nitrogen (including manure, inorganic fertilizer, and organic fertilizer) applied mechanically or by hand. Does NOT include nitrogen deposited by grazing animals when this is the only nitrogen applied. When evaluating this resource concern component, also consider evaluating Nutrients Transported to Surface Water – Nonpoint Nitrogen Surface Loss and Nutrients Transported to Groundwater – Nonpoint Nitrogen Leaching Loss.* | | |
| Answer | Existing Condition Points | Hover Text |
| Nitrogen fertilizer is applied and a nutrient management plan that addresses nitrogen is utilized | 5 | Nitrogen (including manure, inorganic fertilizer, and organic fertilizer) is applied to the PLU mechanically or by hand. Since a nutrient management plan that addresses nitrogen is utilized, document it in the Observed Existing Practices to receive credit. |
| Nitrogen fertilizer is applied, and no nutrient management plan exists | 1 | Nitrogen (including manure, inorganic fertilizer, and organic fertilizer) is applied to the PLU mechanically or by hand. There is no existing nutrient management plan that addresses nitrogen. |

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. If you enter Nutrient Management (590) as an Observed Existing Practice, do not schedule it as a Planned Practice unless it is a “higher-tier” narrative for implementation of Nutrient Management (590).

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

**Objective:** 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. **Note:** This question is asked for multiple resource concern components, as appropriate.

|  |  |  |
| --- | --- | --- |
| Table 147: *Manure Management*  *Question Hover Text: In what form is manure managed at the PLU? If only grazing livestock are present at the PLU (i.e., no confinement), this component is not applicable. When evaluating this resource concern component, also consider evaluating Nutrients Transported to Surface Water – Concentrated Nutrient and Pathogen Surface Loss from Storage and Handling of Manure, Compost, Biosolids, or Non-Ag Food Waste and Nutrients Transported to Groundwater – Concentrated Nutrient and Pathogen Leaching Loss from Storage and Handling of Manure, Compost, Biosolids, or Non-Ag Food Waste.* | | |
| Answer | Existing Condition Points | Hover Text |
| Only solid manure | 1 | There is only solid manure managed at the PLU. If the solid manure is stored under some form of rain exclusion cover to reduce moisture addition, document it in the Observed Existing Practices to receive credit. |
| Liquid or slurry manure or any combination of solid manure with liquid or slurry | 1 | Liquid or slurry manure or any combination of solid manure with liquid or slurry is stored at the PLU. If the manure is treated in an anaerobic digester or an aerobic manure treatment system, or if the manure is stored under a cover, document it in the Observed Existing Practices to receive credit. |

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 148*: Feed Management Plan or Strategy to Manage Nitrogen Excretion*  *Question Hover Text: If only grazing livestock are present at the PLU (i.e., no confinement), this component is not applicable.* | | |
| Answer | Existing Condition Points | Hover Text |
| Livestock are present and a feed management plan is utilized to manage nitrogen emissions | 5 | Since a feed management plan that is utilized, document it in the Observed Existing Practices to receive credit. |
| Livestock are present, and no feed management plan to manage nitrogen emissions exists | 1 | Livestock are present at the PLU, but there is no existing feed management plan or strategy that addresses nitrogen emissions. |

If there is no NRCS-approved feed management plan or strategy that specifically addresses nitrogen emissions, apply Feed Management (592) to develop such a plan. If you enter Feed Management (592) as an Observed Existing Practice, do not schedule it as a Planned Practice

# **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 149.

|  |  |  |
| --- | --- | --- |
| Table 149: Plant Productivity and Health | | |
| Answer | Existing Condition Points | Hover Text |
| High | 50 | No significant plant productivity or health related concern exists on this PLU |
| Good | 30 | Some productivity or plant health concerns exist |
| Poor | 1 | 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 150.

|  |  |  |
| --- | --- | --- |
| Table 150*: Crop Plant Productivity and Health* | | |
| Answer | Existing Condition Points | Hover Text |
| 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.) |

**Forest**

Each PLU for Forest will have a threshold value of 50 set and a benchmark condition set of questions as identified in Table 151 and if needed, Table 152, and Table 154.

|  |  |  |
| --- | --- | --- |
| Table 151: *Current condition of the client’s Forest Management Plan that addresses plant productivity and health* | | |
| Answer | Existing Condition Points | Hover Text |
| 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 | 1 | If selected, the below assessment questions will become active. Complete the assessment questions for this RC below. |
| No Plan Exists | 1 | 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 152*: Managed tree species are native, and best suited for sustainability on the site and commensurate with client’s objectives* | | |
| Answer | Existing Condition Points | Hover Text |
| Yes | 25 |  |
| No | 0 |  |

|  |  |  |
| --- | --- | --- |
| Table 153*: Stocking levels are appropriate for the site and commensurate with client’s objectives* | | |
| Answer | Existing Condition Points | Hover Text |
| Yes | 20 |  |
| No | 0 |  |

|  |  |  |
| --- | --- | --- |
| Table 154*: Tree Vigor within stand or management unit*  Note: What is the proportion of dead and dying trees on the site? | | |
| Answer | Existing Condition Points | Hover Text |
| None to Slight (<10%) | 20 |  |
| Slight to Moderate (10-20%) | 15 |  |
| Moderate (21-40%) | 10 |  |
| Moderate to Extreme (41-60%) | 5 |  |
| Extreme (>60%) | 1 |  |

**Pasture**

Each PLU for Pasture will have a threshold value of 50 set and a benchmark condition set of questions in Table 155, Table 156, and Table 157.

|  |  |  |
| --- | --- | --- |
| Table 155*: Pasture - Percent Desirable Plants* | | |
| Answer | Existing Condition Points | Hover Text |
| 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 156*: Pasture –Plant Cover*  *Question Hover Text: Pasture Condition Score Live or Dormant Plant Cover* | | |
| Answer | Existing Condition Points | Hover Text |
| 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 157*: 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 | Hover Text |
| 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 158.

|  |  |  |
| --- | --- | --- |
| Table 158*: Rangeland Health – Biotic Integrity Attribute* | | |
| Answer | Existing Condition Points | Hover Text |
| 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 159: *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 | Hover Text |
| >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 160: Pasture – Percent Desirable Plants | | |
| Answer | Existing Condition Points | Hover Text |
| 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 *161*: *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 | Hover Text |
| 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 162: Rangeland Health - Biotic Integrity | | |
| Answer | Existing Condition Points | Hover Text |
| 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:**

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.

|  |  |
| --- | --- |
| **Associated Agriculture Land, Crop, Developed Land, Farmstead, Other Rural Land, Water**  Table 163: Plant pest pressure - undesirable plants, insects, diseases, animals, soil borne pathogens, and nematodes. | |
| Answer | Existing Condition Points |
| Plant pest pressure not occurring or is managed so the presence is below the economic threshold and there is no scouting or PAMS techniques implemented | 51 |
| Presence of pests are being scouted and monitored **and/or** PAMS techniques are implemented to keep pests within tolerable limits.  A combination of treatment methods with regards to environmental impacts are employed when economic thresholds are met. Desired yields and client goals are met, and potential environmental impacts are mitigated. | 51 |
| Presence of pests are being scouted and monitored **and/or** PAMS techniques are implemented to keep pests within tolerable limits.  A single treatment method is employed when economic thresholds are met. Desired yields and client goals are met. | 25 |
| Pests are present and plant/crop damage is occurring throughout the stand. Desired yields and client goals are not being met due to pest pressure. | 1 |

|  |  |
| --- | --- |
| Table 164: Plant pest pressure - Chemically resistant pests | |
| Answer | Existing Condition Points |
| Chemical forms and modes of action are rotated and number of applications per growing season is limited to prevent and alleviate pesticide resistance; Crops are rotated and pest resistant varieties are planted. | 51 |
| Chemical forms and modes of action are rotated and number of applications per growing season are limited to prevent and alleviate pesticide resistance. | 25 |
| A single chemical form is used and applied multiple times per season to treat identified pests. | 1 |

|  |  |
| --- | --- |
| Table 165: Plant pest pressure - Invasive species | |
| Answer | Existing Condition Points |
| Invasive species are present but are not affecting desired plant community, yields and client goals. | 51 |
| Invasive species outcompete desired plant community, crop, or lower quality of forage. Desired yields and client goals are not met. | 1 |

|  |  |
| --- | --- |
| **Forest**  Table 166: Plant pest pressure - undesirable plants, insects, diseases, animals, soil borne pathogens, and nematodes. | |
| Answer | Existing Condition Points |
| Plant pest pressure not occurring or presence of pests and a combination of treatment methods with regards to environmental impacts are employed. Desired client goals are met, and potential environmental impacts are mitigated. (best). | 51 |
| Presence of pests and a single treatment method is employed. Desired future condition and client goals are not met. (better). | 25 |
| Pests are present and damage is occurring throughout the stand. Desired future condition and client goals are not being met due to pest pressure. (bad) | 1 |

|  |  |
| --- | --- |
| Table 167: Plant pest pressure - Invasive Species | |
| Answer | Existing Condition Points |
| Invasive species not present or are present but are not affecting desired plant community, desired future condition, and client goals. (best) | 51 |
| Invasive species outcompete desired plant community. Single treatment method is employed. Desired future condition and client goals are not met. (better) | 25 |
| Invasive species outcompete desired plant community. Desired future condition and client goals are not met. (bad) | 1 |

Plant pest pressure - Chemically resistant pests

Not Applicable to Forest Land Use

|  |  |
| --- | --- |
| **Pasture**  Table 168: Plant Pest Pressure - Plant Pest Pressure, Chemical Resistance, Invasive Species | |
| Answer | Existing Condition Points |
| Desirable species exceed 80% of the stand. | 60 |
| Desirable species 61-80% of the stand. | 51 |
| Desirable species 41-60% of the stand. | 30 |
| Desirable species 20 to 40% of the stand. | 10 |
| Desirable species <20% of the stand | 1 |

|  |  |  |
| --- | --- | --- |
| **Range**  Table 169:Plant Pest Pressure- Invasive Species | | |
| Answer | Existing Condition Points | Hover Text |
| Nonnative invasive plants not present. If native invasive species are present, composition matches that expected for the ecological site. | 60 | Interpreting Indicators of Rangeland Health; Indicator 16 is None to Slight departure AND Biotic Integrity is None to Slight. |
| Nonnative species are uncommon throughout the plant community. If native invasive species are present, composition matches that expected for the ecological site (IIRH Indicator 16 Slight to moderate Departure) | 51 | Interpreting Indicators of Rangeland Health; Indicator 16 is Slight to Moderate departure AND Biotic Integrity is Slight to Moderate. |
| Nonnative or native invasive species are scattered throughout the plant community. Native invasive species are above what is expected for the ecological site and/or seed source is impacting the site. (IIRH Indicator 16 Slight to moderate Departure) | 20 | Interpreting Indicators of Rangeland Health; Indicator 16 is Moderate departure and Biotic Integrity is moderate. |
| Nonnative or native invasive species are common throughout the plant community. Native invasive species are significantly above what is expected for the ecological site and/or seed source is impacting the site. (IIRH Indicator 16 Moderate to extreme) | 10 | Interpreting Indicator of Rangeland Health; Indicator 16 is Moderate to extreme departure and Biotic Integrity is Moderate to extreme. |
| Nonnative or native invasive species are dominant throughout the plant community. Seed source is impacting the site. (IIRH Indicator 16 is extreme departure). | 1 | Interpreting Indicators of Rangeland Health; Indicator 16 is Extreme departure and Biotic Integrity is Extreme. |

Note: This resource concern should be selected when treating undesirable plant species that are competitive with desirable species.

Plant pest pressure – Plant Pest Pressure and Chemically resistant pests

Not Applicable to Range land use

## **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 170: , Table 171: , and Table 172.

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

|  |  |
| --- | --- |
| Table 170: 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 171: 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 172: 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.

|  |  |
| --- | --- |
| Table 173: 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 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 the Terrestrial Habitat Assessment Questions by 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 174: Terrestrial Habitat Existing Condition | | |
| Answer | Hover Text | 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 |

**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 175: *Crop (Annual and Mixed) + (Perennial) Assessment Questions and Answer Choices* | | |
| Question | Crop (Annual and Mixed) + (Perennial) 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?  Hover Text: 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?  Hover Text: 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. | 4 |
| 1. 2 out of 3 years with dependable artificial water or precipitation driven flooding on C or D soils. | 9 |
| 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. | 4 |
| 1. >33 and ≤50% of the field. | 9 |
| 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)?  Hover Text: 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. | 1 |
| 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. | 3 |
| 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?  Hover Text: 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. | 2 |
| 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?  Hover Text: 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. | 3 |
| >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?  Hover Text: 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. | 3 |
| >1320 feet and ≤2640 feet. | 1 |
| >2640 feet. | 0 |
|  | What is the cropping system? |  |
| Crop monocultures, includes perennials with low-value to wildlife (e.g. sod-forming grass). | 0 |
| Non-monoculture crop (e.g., intercropping). | 3 |
| Overwintered forage/cover crop or perennials with high-value to wildlife (e.g., cranberry, wild blueberry). | 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). | 2 |
| Winter food source is not a limiting factor for target wildlife species | 3 |
| >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 |
|  | Is the residue or stubble management for the over-winter condition suitable for the target wildlife species?  Hover Text: Residue or stubble management must apply to at least 50% of the field. Suitability of the over-winter condition defined by the State Biologist. |  |
| No | 0 |
| Yes | 12 |
|  | If hay is part of crop rotation, what is the species composition of wildlife-unfriendly species?  Hover Text: 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. | 2 |
| 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?  Hover Text: 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. | 1 |
| >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. | 3 |
| 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 176: *Pasture Assessment Questions and Answer Choices* | | |
| Question | Pasture Assessment Questions and Answer Choices | Existing Condition Points |
|  | What is the species composition of the pasture?  Hover Text: 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. | 3 |
| 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?  Hover Text: 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. |  |
| All forage that is important for target wildlife species is closely grazed, livestock trails are numerous and trampling damage is widespread OR pasture type/management strategy provides little to no habitat value to target wildlife species. | 0 |
| 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. | 3 |
| 20- 50% of the entire 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 |
| Entire grazed area with ≥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?  Hover Text: 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. | 2 |
| 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. | 4 |
| 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?  Hover Text: 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. | 3 |
| 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?  Hover Text: 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. | 3 |
| 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?  Hover Text: 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. | 4 |
| 1. >1320 feet and ≤2640 feet. | 2 |
| 1. >2640 feet. | 0 |

|  |  |  |
| --- | --- | --- |
| Table 177: Range Assessment Questions and Answer Choices | | |
| Question | Range Assessment Questions and Answer Choices | Existing Condition Points |
|  | What is the species composition of the rangeland (i.e., Functional/Structural (F/S) Groups)?  Hover Text: 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]. | 1 |
| 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]. | 3 |
| 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]. | 11 |
| 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?  Hover Text: 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. | 3 |
| 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. | 6 |
| 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%. | 3 |
| 1. >50% and ≤75%. | 7 |
| 1. >75%. | 9 |
|  | Are artificial water sources present? |  |
|  | 1. No | 11 |
|  | 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%. | 2 |
| 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. | 7 |
| 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. | 7 |
| 1. >20% of the site has invasive or noxious plants. | 0 |

|  |  |  |
| --- | --- | --- |
| Table 178: *Forest Assessment Questions and Answer Choices* | | |
| Question | Forest 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?  Hover Text: 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?  Hover Text: Guidance on sufficient habitat for target wildlife species set by State Biologist. |  |
| Yes | 30 |
| No | 0 |
|  | What is the percent of understory cover that is beneficial for the target wildlife species?  Hover Text: 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% | 2 |
| >10% and ≤25% | 1 |
| ≤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. | 4 |
| >15%, active management. | 3 |
| >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. | 3 |
| 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 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 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 173). Planners can select the “Working Lands for Wildlife Guide or State Wildlife Guide option and answer the Aquatic Habitat Exiting Condition below (see Table 179).

|  |  |  |
| --- | --- | --- |
| Table 179*: Aquatic Habitat Existing Condition* | | |
| Answer | Existing Condition Points | Hover Text |
| 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. |

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 179 and the assessment question by water feature type listed below may be bypassed (i.e., they do not need to be answered).

|  |  |  |
| --- | --- | --- |
| Table 180*: Aquatic Habitat Assessment Questions and Answer Choices* | | |
| Question | Aquatic Habitat Assessment Questions and Answer Choices | Existing Condition Points |
|  | What water features are present on the PLU?  Hover Text: Select all that apply. |  |
| Coastal | *See Coastal questions* |
| Lake/Pond | *See Lake/Pond questions* |
| River (non-wadeable) | *See River questions* |
| Stream (wadeable) | *See Stream questions* |
| Wetland | *See Wetland questions* |
| ***Coastal*** | | |
|  | Return to the Wildlife survey group, question *Aquatic Habitat Assessment Method* to select either 1) Working Lands for Wildlife Guide, or 2) State Wildlife Guide. |  |
|  | 1. Coastal water features are not being assessed by National Land Use Assessment questions. Coastal water feature assessment may only be reported in CART using a state approved assessment method. Planner should return to the first Wildlife survey group question, *Aquatic Habitat Assessment Method*, and select either 1) Working Lands for Wildlife Guide, or 2) State Wildlife Guide to complete an assessment in CART for the coastal water feature. | 0 |
| ***Lake/Pond (includes vernal pools)*** | | |
|  | Is water available in sufficient quantity and quality to support habitat requirements for target wildlife species?  Hover Text: Guidance on habitat requirements for target wildlife species set by State Biologist. |  |
|  | 1. Yes | 25 |
|  | 1. No | 0 |
|  | Is the lack of water quantity or quality caused by offsite conditions?  Hover Text: Lack of water or degraded water quality may be due to conditions outside of control of the producer and landowner. This question is a way to note that situation. |  |
|  | 1. Yes | 25 |
|  | 1. No | -10 |
|  | Are habitat features (e.g., water depth, submerged structures, littoral zones, aquatic vegetation) present at the desirable level to support the target wildlife species?  Hover Text: Guidance on habitat requirements for target wildlife species set by State Biologist. |  |
|  | 1. Yes | 25 |
|  | 1. No | 0 |
|  | What is the extent of the natural vegetation surrounding the lake and pond?  Hover Text: 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. | 25 |
| >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. | 17 |
| >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. | 8 |
| ≤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?  Hover Text: 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. | 25 |
| 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. | 17 |
| Natural vegetation present but compromised by poor management; evidence of concentrated flows; invasive species common (>20% to 50% cover). | 8 |
| Little or no natural vegetation in the riparian zone, >50% cover invasive species, and evidence of concentrated flows into the lake/pond. | 0 |
| ***River (non-wadeable during normal flows; includes intermittent or ephemeral)*** | | |
|  | Is water available in sufficient quantity and quality to support habitat requirements for target wildlife species?  Hover Text: 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 quantity or quality caused by offsite conditions?  Instructions: Lack of water or degraded water quality 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 | -20 |
|  | Are there physical structures, water withdrawals, water quality, or some combination of these within landowner control that restricts or prohibits movement of aquatic species?  Hover Text: 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. | -20 |
| 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?  Hover Text: 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; includes intermittent or ephemeral)*** | | |
|  | Are there eight or more aquatic habitat features present on the PLU stream reach, defined as 12 x bankfull width?  Hover Text: 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 | 28 |
| No | 0 |
|  | Is water available in sufficient quantity and quality to support habitat requirements for target aquatic species?  Hover Text: Guidance on habitat requirements for target aquatic species set by State Biologist. |  |
| 1. Yes | 24 |
| 1. No | 0 |
| ***If b) No is selected for question number 2, the following additional question should be answered.*** | | |
|  | Is the lack of water quantity or quality caused by off-site conditions?  Hover Text: Lack of water or degraded water quality 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 | -25 |
| 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? |  |
| 1. Yes, verified in field. | -25 |
| 1. No, verified in field. | 24 |
| 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?  Hover Text: 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 | 24 |
| 1. No | 0 |
| ***Wetland*** | | |
| 1) | What is the extent of the riparian buffer around the wetland?  Hover Text: 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. | 5 |
| 1. <10% of the perimeter of the wetland is buffered by a ≥35-ft-wide strip of perennial vegetative cover. | 2 |
|  | What is the quality of the riparian buffer around the wetland?  Hover Text: 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). | 5 |
| Little or no natural vegetation. Invasive species widespread (>50 % of plant cover). | 0 |
|  | What is the quality of the vegetation within the wetland?  Hover Text: 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). | 5 |
| 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? |  |
| 1. Yes | -10 |
| 1. 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**

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 Elevated Water Temperature is selected as a Resource Concern to assess, 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 181.

|  |  |
| --- | --- |
| Table 181*: Section 303(d) listing of Clean Water Act for Temperature is caused by onsite conditions* | |
| Answer | Existing Condition Points |
| Yes | 0 |
| No | 30 |

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 182*: 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?  Hover Text: 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??  Hover Text: 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 183 and Table 184.

|  |  |
| --- | --- |
| **Crop (grazed)**  Table 183: Livestock Feed and Forage – Grazed Crop | |
| Answer | Existing Condition Points |
| Livestock forage, roughage and supplemental nutritional requirements are addressed AND Sufficient residue and/or stubble height is maintained to prevent or mitigate other resource concerns. | 51 |
| Livestock forage, roughage and supplemental nutritional requirements are addressed  AND  Sufficient residue and/or stubble height is **NOT** maintained to prevent or mitigate other resource concerns. | 30 |
| Livestock forage, roughage and supplemental nutritional requirements are NOT addressed | 1 |

|  |  |  |
| --- | --- | --- |
| **Farmstead, Forest (grazed)**  Table 184: Livestock Feed and Forage – Farmstead and Grazed Forest | | |
| Answer | Existing Condition Points | Hover Text |
| Livestock feed, roughage, and supplemental nutritional requirements are met | 51 | Livestock forage, roughage and supplemental nutritional requirements addressed. AND An inventory of Livestock-Forage/Feed is in balance for intended use. (NRPH) |
| Livestock feed, roughage, and supplemental nutritional requirements are NOT met | 1 | Livestock forage, roughage and supplemental nutritional requirements is NOT addressed. AND An inventory of Livestock-Forage/Feed is NOT in balance for intended use. (NRPH) |

|  |  |  |
| --- | --- | --- |
| **Pasture**  Table 185: Livestock Feed and Forage - Pasture | | |
| Answer | Existing Condition Points | Hover Text |
| Adequate forage budget (pasture and supplemental feed) and producer desired goals are being met | 51 | Both PCS - Grazing Utilization and Severity element ≥ 4 OR if DIPH is used, sufficient residual and/or stubble heights to mitigate other RCs are maintained; AND An inventory of Livestock Forage/Feed is in balance for intended use. |
| Moderate forage supply and producer desired production goals are NOT being met. | 30 | 1) Either an inventory of Livestock Forage/Feed is **NOT** in balance for intended use; OR 2) if PCS is run, Grazing Utilization and Severity element result is less than 4, OR ifDIPH is run the result is insufficient residual and/or stubble height is maintained to mitigate other RCs. (One component of the two is not being met) |
| Inadequate forage supply and producer desired production goals are NOT being met. | 1 | Both 1) the inventory of Livestock Forage/Feed is **NOT** in balance for intended use and 2) if PCS is run Grazing Utilization and Severity element is 3 or less **OR if** DIPH is used, the result shows insufficient residual and/or stubble height is being maintained to mitigate other RCs from forming. (**Both** components are **not** being met) |

|  |  |  |
| --- | --- | --- |
| **Range**  Table 186: *Livestock Feed and Forage – Range (consider all sources of feed)* | | |
| Answer | Existing Condition Points | Hover Text |
| Adequate forage budget (pasture and supplemental feed) and producer desired goals are being met | 51 | Biotic integrity attribute **(there are 9 indicators):** slight to moderate or less (IIRH) AND Annual Production Indicator (#15): slight to moderate departure or less. (NRPH) AND An inventory of Livestock-Forage/Feed is in balance for intended use. |
| Forage supply and producer desired livestock production goals are NOT being met. | 30 | Range - Interpreting Indicators of  Range Health   - Biotic Integrity Attribute Score is moderate or more. |
| Inadequate forage supply and producer desired livestock production goals are NOT being met | 1 | Range - Interpreting Indicators of Range Health - Biotic Integrity Attribute Score is greater than moderate. |

## **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 187.

|  |  |
| --- | --- |
| Table 187: 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 188 and Table 189.

|  |  |
| --- | --- |
| Table 188: Terrestrial Livestock Water Existing Condition (Quality, Quantity, and Distribution factors)  Note: Livestock water factors are Quality, Quantity, and Distribution. Refer to local Extension Service guidelines, State guidelines, or NRPH to determine if water factors are met | |
| 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 |

**All land uses where aquaculture is occurring.**

|  |  |
| --- | --- |
| Table 189: Aquacultured Livestock Water Existing Condition (Quality, Quantity, and Distribution factors)  Note: Livestock water factors are Quality, Quantity, and Distribution. Refer to local Extension Service guidelines, State guidelines, or NRPH to determine if water factors are met | |
| 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. A threshold value of 50 will be set and existing condition questions will be triggered. CART will present the questions about existing conditions to a user as seen in Table 190 and Table 191.

| Table 190*: Does the client have a current energy audit or results from an NRCS Energy Estimator?*  *Question Hover Text:* A current energy audit that meets ASABE S612, or results from the Energy Estimator tool for Animal Housing or Irrigation, or results from the Energy Self-Assessment Tools for Conservation that provide recommendations to improve energy efficiency or reduce energy use. See website: <https://energytools.sc.egov.usda.gov/>. The determination if the audit or tool result is current is based upon the adequacy of the recommendations compared to the current operation. The determination is not based upon the age of the audit or tool result but rather if the operation has changed, technology advanced, or all previous recommendations have been implemented*.* | | |
| --- | --- | --- |
| Answer | Existing Condition Points | Hover Text |
| Yes | 0 | Proceed to next question. |
| No | 0 | Implementation of the NRCS CEMA 228 Agricultural Energy Assessment, obtaining an ASABE S612 compliant audit, or running the Energy Estimator tools may be recommended to the client. Proceed to next question. |

| Table 191*: Do the energy audit or energy estimator(s), or field observation indicate the PLU will benefit from energy improvements?*  *Question Hover Text:* In the absence of an energy audit or estimator results, choose “No” if all recommended energy efficiency improvements have been made to any of the following that are present on the PLU (this list is not all inclusive): stationary equipment or machinery, devices, pumps, motors, compressors, heaters, lighting, environmentally controlled buildings or greenhouses AND if all recommended energy efficiency improvements have been made to any of the following activities on the PLU (this list is not all inclusive): irrigation with pumping, drying, evaporating, refrigeration, transferring or handling liquid or solid materials or products. Otherwise, choose “Yes.” | | |
| --- | --- | --- |
| Answer | Existing Condition Points | Hover Text |
| Yes | 5 | Results or observations indicate one or more energy efficiency improvements can be implemented. |
| No | 51 | There are no energy efficiency improvements to be implemented. |

## **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 questions will be triggered. CART will present the questions about existing conditions to a user as seen in Table 192 and Table 193.

| Table 192*: Does the client have a current energy audit or results from an NRCS Energy Estimator?*  *Question Hover Text:* A current energy audit that meets ASABE S612 *and includes cultural practices,* or results from the Energy Estimator tool for Tillage, or results from the current NRCS wind and water erosion prediction technologies that provide recommendations to improve energy efficiency or reduce energy use. The determination if the audit or tool result is current is based upon the adequacy of the recommendations compared to the current operation. The determination is not based upon the age of the audit or tool result but rather if the operation has changed, technology advanced, or all previous recommendations have been implemented. | | |
| --- | --- | --- |
| Answer | Existing Condition Points | Hover Text |
| Yes | 0 | Proceed to next question. |
| No | 0 | Implementation of the NRCS CEMA 228 Agricultural Energy Assessment, obtaining an ASABE S612 compliant audit with cultural practices, or running the Energy Estimator tools may be recommended to the client. Proceed to next question. |

| Table 193*: Do the energy audit or energy estimator(s), or field observation indicate the PLU will benefit from energy improvements?*  *Question Hover Text:* In the absence of an energy audit or tool results, choose “No” if all recommended energy efficiency improvements have been made to any of the following activities on the PLU (this list is not all inclusive): using mobile field equipment for tilling, planting, harvesting, spreading fertilizers, pesticides, manure or amendments; using mobile equipment to transfer, handle, or process liquid or solid material and products. All energy use related to irrigation and grain drying shall be assessed in the Equipment and Facilities resource concern. Otherwise, choose “Yes.” | | |
| --- | --- | --- |
| Answer | Existing Condition Points | Hover Text |
| Yes | 5 | There are one or more energy efficiency improvements that can be implemented. |
| No | 51 | There are no energy efficiency improvements to be implemented. |

# **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”.

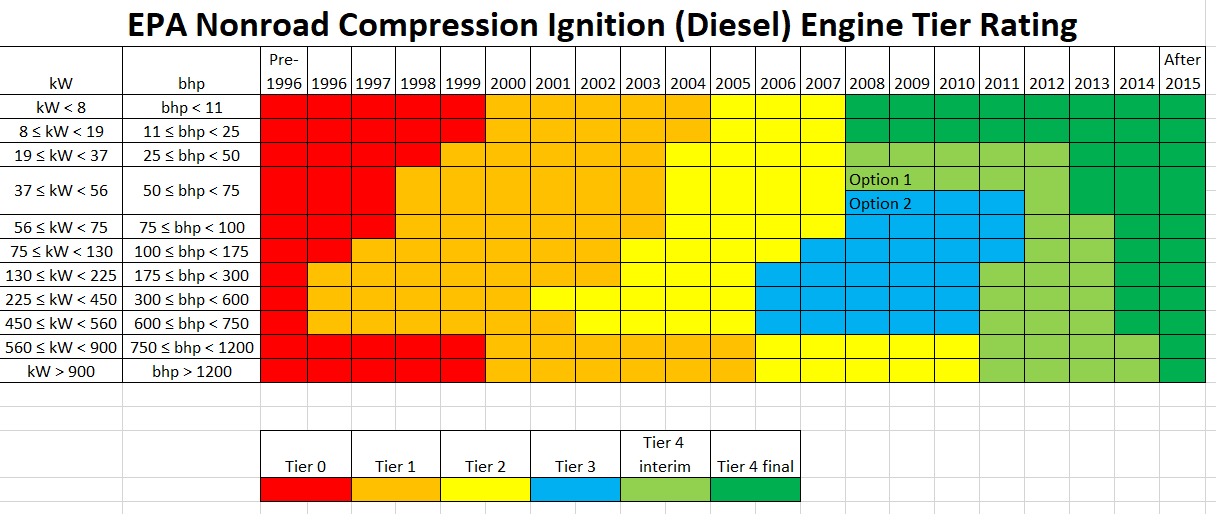
**Threshold:** Measure of intrinsic site vulnerability and amount of conservation effort to reach a “sustainable” level. Thresholds may be normalized at 50 points but are representative of NRCS planning criteria.

## **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>



1. Future iterations of CART will take a systems-wide approach and assign points to conservation practices based on their relative effectiveness to contribute to functional groups, where functional groups represent functions – developed for each resource concern – that successful conservation systems must perform to meet that natural resource’s treatment needs. [↑](#footnote-ref-2)