

### Caribbean Area Concerns and Quality Criteria

Natural Resource Concern	Description of Concern	State Quality Criteria	Measurement Units	Assessment Tools for Quality Criteria Evaluation
<b>SOIL</b>				
<b>Soil Erosion Sheet and rill</b>	Detachment and transport of soil particles caused by rainfall splash and runoff degrade soil quality.	Sheet and rill erosion does not exceed the Soil Loss Tolerance "T".	Tons/acre/year – average annual tons of erosion reduced per acre for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment (pedestals, rills)</li> <li>• Special inventory methods (e.g., Tropical Pasture Condition Score Sheet)</li> <li>• RUSLE2</li> <li>• Erosion and Sediment Control Handbook for Developing Areas</li> <li>• Soil survey interpretation report for soil erosion phases</li> </ul>
<b>Soil Erosion Ephemeral gully</b>	Small channels caused by surface water runoff degrade soil quality and tend to increase in size. On cropland, they can be obscured by heavy tillage.	Surface water runoff is controlled sufficiently to stabilize the small channels and prevent reoccurrence of new channels.	Tons/year – average annual tons of erosion reduced for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Volume calculation</li> <li>• Erosion and Sediment Control Handbook for Developing Areas</li> <li>• Soil survey interpretation report</li> </ul>
<b>Soil Erosion Classic gully</b>	Deep, permanent channels caused by the convergence of surface runoff degrade soil quality. They enlarge progressively by headcutting and lateral widening.	Surface water runoff is controlled sufficiently to stop progression of headcutting and widening.	Tons/year – average annual tons of erosion reduced for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Volume calculation</li> <li>• Aerial photo trend analysis</li> <li>• Erosion and Sediment Control Handbook for Developing Areas</li> <li>• Soil survey interpretation report</li> <li>• Topographic Maps</li> </ul>
<b>Soil Erosion Streambank</b>	Accelerated loss of streambank soils restricts land and water use and management.	Accelerated streambank soil loss does not exceed a level commensurate with upstream land use and normal geomorphological processes on site.	Tons/year – average annual tons of erosion reduced for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment (stream)</li> <li>• Client interview</li> <li>• Aerial photo trend analysis</li> <li>• National Engineering Handbook, Part 650 - Engineering Field Handbook, Chapter 16</li> </ul>

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<b><u>Soil Erosion Shoreline</u></b>	Soil is eroded along shorelines by wind and wave action, causing physical damage to vegetation, limiting land use, or creating a safety hazard.	Shoreline erosion is stabilized to a level that does not restrict the use or management of adjacent land, water or structures.	Tons/year – average annual tons of erosion reduced for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Client interview</li> <li>• Aerial photo trend analysis</li> <li>• Volume calculation</li> <li>• Erosion transects/pins</li> </ul>
<b><u>Soil Erosion Irrigation induced</u></b>	Improper irrigation water application and equipment operation are causing soil erosion that degrades soil quality.	Irrigation-induced erosion does not exceed the Soil Loss Tolerance “T”.	Tons/acre/year – average annual tons of erosion reduced per acre for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Client interview</li> <li>• National Engineering Handbook, Part 652 – Irrigation Guide</li> <li>• Irrigation Water Management Plan</li> <li>• Caribbean Area Approved Engineering Tools (Pipeline, IWRpm, Sprinkler Worksheet, Trickle Worksheet)</li> <li>• Farm Irrigation Rating Method</li> </ul>
<b><u>Soil Erosion Mass movement</u></b>	Soil slippage, landslides, or slope failure, normally on hillsides, result in large volumes of soil movement.	Shallow slumps, slides, or slips are prevented or minimized so that the mass movement of soil material does not exceed naturally occurring rates.	Tons/year – average annual tons of erosion reduced for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Aerial photo trend analysis</li> <li>• Volume calculation</li> <li>• Erosion and Sediment Control Handbook for Developing Areas</li> </ul>
<b><u>Soil Erosion Road, road sides, and construction sites</u></b>	Soil loss occurs on areas left unprotected during or after road building and/or construction activities.	Sites are adequately protected from soil loss during and after road building and construction activities.	Tons/year – average annual tons of erosion reduced for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Volume calculation</li> <li>• Water erosion prediction tools (RUSLE2)</li> <li>• Erosion and Sediment Control Handbook for Developing Areas</li> <li>• Soil survey interpretation report</li> </ul>
<b><u>Soil Condition Organic matter depletion</u></b>	Soil organic matter has lowered or will diminish to a level that degrades soil quality.	Soil Conditioning Index is positive.	Soil Conditioning Index improvement – positive improvement in index for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Soil Conditioning Index</li> <li>• Soil testing and analysis</li> </ul>

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<b><u>Soil Condition</u> Compaction</b>	Compressed soil particles and aggregates caused by mechanical compaction adversely affect plant-soil-moisture relationships.	Mechanically compacted soils are renovated sufficiently to restore plant root growth and/or water movement.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment (e.g. plant root system; lack of vegetation, soil compacted due to animal, human or other contributing factors)</li> </ul>
<b><u>Soil Condition</u> Subsidence</b>	Loss of volume and depth of organic soils due to oxidation caused by above normal microbial activity resulting from excessive drainage or extended drought.	The timing and regime of soil moisture is managed to attain acceptable subsidence rates.	Inches/acre/year – average annual inches of subsidence reduced per acre for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Inventory of soil volume and depth</li> <li>• Soil probes and witness poles</li> </ul>
<b><u>Soil Condition</u> Contaminants: Salts and other chemicals</b>	Inorganic chemical elements and compounds such as salts, selenium, boron, and heavy metals restrict the desired use of the soil or exceed the soil buffering capacity.	Salinity levels cause less than a 10% decrease in plant yield. Other contaminants do not exceed plant tolerances or are below toxic levels for plants or animals.	Electro conductivity (EC) – average reduction in EC for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Soil test</li> <li>• Yield records/history</li> <li>• Visual assessment</li> </ul>
<b><u>Soil Condition</u> Contaminants: Animal waste and other organics - N</b>	Nitrogen nutrient levels from applied animal waste and other organics restrict desired use of the land.	Nitrogen nutrient application levels do not exceed soil storage/plant uptake capacities based on soil test recommendations and risk analysis results.	Pounds/acre/year – average annual pounds of nitrogen (N) reduced per acre for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Soil test</li> <li>• Plant tissue test</li> <li>• Application records</li> <li>• Yield records/history</li> <li>• Caribbean Area Nutrient Budget and Balance Worksheet</li> <li>• National Engineering Handbook, Part 651 – Agricultural Waste Management Field Handbook</li> <li>• Caribbean Area AWMS Design Worksheet</li> <li>• Comprehensive nutrient management plan</li> </ul>

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<p><b>Soil Condition</b>  <b>Contaminants:</b>  <b>Animal waste and other organics - P</b></p>	<p>Phosphorous nutrient levels from applied animal waste and other organics restrict desired use of the land.</p>	<p>Phosphorous nutrient application levels do not exceed soil storage/plant uptake capacities based on soil test recommendations and risk analysis results.</p>	<p>Pounds/Acre/Year – average annual pounds of phosphorous (P) reduced per acre for the field or planning area/unit</p>	<ul style="list-style-type: none"> <li>• Soil test</li> <li>• Plant tissue test</li> <li>• Application records</li> <li>• Yield records/history</li> <li>• Caribbean Area Nutrient Budget and Balance Worksheet</li> <li>• National Engineering Handbook, Part 651 – Agricultural Waste Management Field Handbook</li> <li>• Caribbean Area AWMS Design Worksheet</li> <li>• Comprehensive nutrient management plan</li> <li>• Caribbean Area Phosphorous Index</li> </ul>
<p><b>Soil Condition</b>  <b>Contaminants:</b>  <b>Animal waste and other organics - K</b></p>	<p>Potassium nutrient levels from applied animal waste and other organics restrict desired use of the land.</p>	<p>Potassium nutrient application levels do not exceed soil storage/plant uptake capacities based on soil test recommendations and risk analysis results.</p>	<p>Pounds/acre/year – average annual pounds of potassium (K) reduced per acre for the field or planning area/unit</p>	<ul style="list-style-type: none"> <li>• Soil test</li> <li>• Plant tissue test</li> <li>• Application records</li> <li>• Yield records/history</li> <li>• Caribbean Area Nutrient Budget and Balance Worksheet</li> <li>• National Engineering Handbook, Part 651 – Agricultural Waste Management Field Handbook</li> <li>• Caribbean Area AWMS Design Worksheet</li> <li>• Comprehensive nutrient management plan</li> </ul>
<p><b>Soil Condition</b>  <b>Contaminants:</b>  <b>Commercial fertilizer – N</b></p>	<p>Over application of nitrogen degrades plant health and vigor, or exceeds the soil capacity to retain nutrients.</p>	<p>Soil nutrient levels of nitrogen do not exceed crop needs based on realistic yield goals and appropriate pH levels are maintained.</p>	<p>Pounds/acre/year – average annual pounds of nitrogen (N) reduced per acre for the field or planning area/unit</p>	<ul style="list-style-type: none"> <li>• Soil test</li> <li>• Plant tissue test</li> <li>• Application records</li> <li>• Yield records/history</li> <li>• Caribbean Area Nutrient Budget and Balance Worksheet</li> <li>• Comprehensive nutrient management plan</li> </ul>

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<b>SOIL</b>				
<b>Soil Condition Contaminants: Commercial fertilizer – P</b>	Over application of phosphorous degrades plant health and vigor, or exceeds the soil capacity to retain nutrients.	Soil nutrient levels of phosphorous do not exceed crop needs based on realistic yield goals and appropriate pH levels are maintained.	Pounds/acre/year – average annual pounds of phosphorous (P) reduced per acre for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Soil test</li> <li>• Phosphorus Index</li> <li>• Plant tissue test</li> <li>• Application records</li> <li>• Yield records/history</li> <li>• Caribbean Area Nutrient Budget and Balance Worksheet</li> <li>• Comprehensive nutrient management plan</li> </ul>
<b>Soil Condition Contaminants: Commercial fertilizer - K</b>	Over application of potassium degrades plant health and vigor, or exceeds the soil capacity to retain nutrients.	Soil nutrient levels of potassium do not exceed crop needs based on realistic yield goals and appropriate pH levels are maintained.	Pounds/acre/year – average annual pounds of potassium (K) reduced per acre for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Soil test</li> <li>• Plant tissue test</li> <li>• Application records</li> <li>• Yield records/history</li> <li>• Caribbean Area Nutrient Budget and Balance Worksheet</li> <li>• Comprehensive nutrient management plan</li> </ul>
<b>Soil Condition Contaminants: Residual pesticides</b>	Residual pesticides in the soil have an adverse effect on non-target plants and animals.	Pesticides are applied, stored, handled, and disposed of so that residues in the soil do not adversely affect non-target plants and animals.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• WIN-PST (Windows Pesticide Screening Tool – USDA/NRCS)</li> <li>• Soil test</li> <li>• Plant and animal tissue test</li> <li>• Pesticide application records</li> <li>• Pesticides labels</li> </ul>
<b>Soil Condition Damage from soil deposition</b>	Sediment deposition damages or restricts land use/management or adversely affects ecological processes.	Sediment deposition is sufficiently reduced to maintain desired land use/management and ecological processes.	Acres/year – average annual acres of sediment deposition reduced for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Volume calculation</li> <li>• Current water prediction tools (RUSLE2) coupled with sediment delivery ratios</li> <li>• Plant and animal community assessment</li> </ul>

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<b>WATER</b>				
<b><u>Water Quantity</u> Excessive seepage</b>	Subsurface water oozing to the surface restricts land use and management.	Subsurface water is managed to limit periods of saturation that are unfavorable to the present or intended land use. Management complies with wetland policies.	Acres/year – average annual acres of seep reduced for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment (physical presence of water, prevalence of hydrophytic vegetation, etc.)</li> <li>• Client interview</li> <li>• Area measurements</li> </ul>
<b><u>Water Quantity</u> Excessive runoff, flooding, or ponding</b>	The land becomes inundated restricting land use and management.	Excess water amounts and/or rates of flow are controlled consistent with desired present or intended land use goals and wetland policies.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Client interview</li> <li>• Stream Visual Assessment Protocol</li> <li>• National Engineering Handbook, Part 650 (EFH – Chapters 2 and 3)</li> <li>• Hydrologic models, e.g. HECRAS, TR-20, TR-55</li> </ul>
<b><u>Water Quantity</u> Excessive subsurface water</b>	Water saturates upper soil layers restricting land use and management.	Subsurface water is managed to limit periods of saturation compatible with the present or intended land use and wetland policies. Must comply with all state wetland rules and regulations.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment (soil cores and coring holes)</li> <li>• Plant quality and quantity measurements</li> <li>• National Engineering Handbook, Part 650 (EFH-Chapter 14)</li> </ul>
<b><u>Water Quantity</u> Inadequate outlets</b>	Natural or constructed outlets too small to remove excess water in a timely manner.	Outlets are designed, installed, upgraded or maintained to adequately convey water for present or intended uses. Must comply with all state wetland rules and regulations.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Client interview</li> <li>• National Engineering Handbook, Part 650 (EFH – Chapters 2, 3 and 7)</li> <li>• Hydrologic models, e.g. HECRAS, TR-20, TR-55</li> </ul>
<b><u>Water Quantity</u> Inefficient water use on irrigated land</b>	Limited water supplies are not optimally utilized.	Land and water management is planned and coordinated to provide optimal use of natural and applied moisture.	Acre-inches/acre/year – average annual acre-inches of water per acre used more beneficially for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• National Engineering Handbook, Part 652, Irrigation Guide</li> <li>• Crop quality and quantity measurements</li> <li>• Irrigation Water Management Plan</li> <li>• Caribbean Area Approved Engineering Tools (Pipeline, IWRpm, Sprinkler Worksheet, Trickle Worksheet)</li> <li>• Farm Irrigation Rating Method</li> </ul>

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<b>WATER</b>				
<b><u>Water Quantity</u> Inefficient water use on nonirrigated land</b>	Natural moisture is not optimally utilized.	Management provides optimum use of natural moisture for the present or intended land use.	Acre-inches/acre/year – average annual acre-inches of water per acre used more beneficially for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Plant or animal quality and quantity measurements</li> <li>• Soil survey interpretations records of soil water availability</li> </ul>
<b><u>Water Quantity</u> Reduced capacity of conveyances by sediment deposition</b>	Sediment deposits in ditches, canals, culverts, and other water conveyances reduce the desired flow capacity.	Conveyance structures are upgraded or maintained to adequately convey water for present or intended uses.	Cubic yards – volume of sediment in cubic yards removed to maintain water conveyances for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Client interview</li> <li>• National Engineering Handbook, Part 650 (EFH – Chapters 2, 3, and 7)</li> <li>• Hydrologic models, e.g., HECRAS, TR-20, TR-55</li> </ul>
<b><u>Water Quantity</u> Reduced storage of water bodies by sediment accumulation</b>	Sediment deposits in water bodies reduce the desired volume capacity.	Water bodies and contributing source areas are treated to allow sufficient water storage for present and intended uses.	Acre-inches/year – average annual reduction in acre-inches in sediment deposition within water bodies for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Depth and area measurements</li> <li>• National Engineering Handbook, Part 650 (EFH – Chapters 2, 3, 7 and 11)</li> </ul>
<b><u>Water Quantity</u> Aquifer overdraft</b>	Water withdrawals exceed the safe yield for the aquifer.	Land and water management are coordinated to balance aquifer recharge and withdrawals to maintain the safe yield for the aquifer.	Acre-inches/year – average annual reduction in acre-inches of groundwater overdraft for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Water level measurements</li> </ul>
<b><u>Water Quantity</u> Insufficient flows in water courses</b>	Water flows are not consistently available in sufficient quantities to support ecological processes and land use and management.	Authorized uses and management of water are coordinated to minimize the impacts on water course flows.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Water flow records</li> <li>• Gauge Station data</li> <li>• Consumptive use/allocation water rights</li> <li>• Habitat Evaluation Guides</li> <li>• National Biology Handbook</li> </ul>

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<b>WATER</b>				
<b><u>Water Quality</u> Harmful levels of pesticides in ground water</b>	Residues resulting from the use of pest control chemicals degrade ground water quality.	Pesticides are applied, stored, handled, disposed of, and managed so that ground water uses are not adversely affected	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• WIN-PST</li> <li>• Pesticide application records</li> <li>• Pesticides labels</li> </ul>
<b><u>Water Quality</u> Excessive nutrients and organics in ground water</b>	Pollution from natural or human induced nutrients such as N, P, and S (including animal and other wastes) degrades ground water quality.	Nutrients and organics are stored, handled, disposed of, and applied such that ground water uses are not adversely affected.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• National Engineering Handbook, Part 651, Ag. Waste Mgt. Field Handbook</li> <li>• Caribbean Area Phosphorous Index</li> <li>• Caribbean Area Nutrient Budget and Balance Worksheet</li> </ul>
<b><u>Water Quality</u> Excessive salinity in ground water</b>	Pollution from salts such as Ca, Mg, Na, K, HCO <sub>3</sub> , CO <sub>3</sub> , Cl, and SO <sub>4</sub> degrades ground water quality.	Salts are stored, handled, disposed of, applied, and managed such that ground water uses are not adversely affected.	Electro conductivity (EC) – average reduction in EC for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• National Engineering Handbook, Part 652, Irrigation Guide</li> <li>• Soil salinity sampling and assay</li> </ul>
<b><u>Water Quality</u> - Harmful levels of heavy metals in ground water</b>	Natural or human induced metal pollutants present in toxic amounts degrade ground water quality.	Materials containing heavy metals are stored, handled, disposed of, applied, and managed such that ground water uses are not adversely affected.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> </ul>
<b><u>Water Quality</u> Harmful levels of pathogens in ground water</b>	Kinds and numbers of viruses, protozoa, and bacteria are present at a level that degrades ground water quality.	Materials that harbor pathogens are stored, handled, disposed of, applied, and managed such that ground water uses are not adversely affected.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• National Engineering Handbook, Part 651 – Agricultural Waste Management Field Handbook</li> </ul>
<b><u>Water Quality</u> Harmful levels of petroleum in ground water</b>	Fuel, oil, gasoline, and other hydrocarbons present in toxic amounts degrade ground water quality.	Petroleum products are used, stored, handled, disposed of, and managed such that ground water uses are not adversely affected.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> </ul>

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<b><u>Water Quality</u> Harmful levels of pesticides in surface water</b>	Pest control chemicals present in toxic amounts degrade surface water quality.	Pesticides are applied, stored, handled, disposed of, and managed such that surface water uses are not adversely affected	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• WIN-PST</li> <li>• Pesticide application records</li> <li>• Pesticides labels</li> </ul>
<b><u>Water Quality</u> Excessive nutrients and organics in surface water</b>	Pollution from natural or human induced nutrients such as N, P, and S (including animal and other wastes) degrades surface water quality.	Nutrients and organics are stored, handled, disposed of, and managed such that surface water uses are not adversely affected.	Nonmeasurable	<ul style="list-style-type: none"> <li>• SVAP (Stream Visual Assessment Protocol – USDA/NRCS)</li> <li>• Caribbean Area Phosphorous Index</li> <li>• National Engineering Handbook, Part 651, Ag. Waste Mgt. Field Handbook</li> <li>• Caribbean Area AWMS Design Worksheet</li> </ul>
<b><u>Water Quality</u> Excessive suspended sediment and turbidity in surface water</b>	Excessive concentration of mineral or organic particles, algae, or organic stains degrades surface water quality.	Delivery or suspension of mineral and organic particles, and excessive algae growth or organic stains is managed such that surface water uses are not adversely affected.	Nonmeasurable.	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Client interview</li> <li>• SVAP (Stream Visual Assessment Protocol – USDA/NRCS)</li> <li>• Aerial photo trend analysis</li> <li>• Erosion and Sediment Control Handbook for Developing Areas</li> </ul>
<b><u>Water Quality</u> Harmful levels of heavy metals in surface water</b>	Natural or human induced metal pollutants are present in toxic amounts that degrade surface water quality.	Materials containing heavy metals are stored, handled, disposed of, applied, and managed such that surface water uses are not adversely affected.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Client interview</li> </ul>
<b><u>Water Quality</u> Harmful temperatures of surface water</b>	Undesired thermal conditions degrade surface water quality.	Use and management of land and water are coordinated to minimize impacts on surface water temperatures.	Nonmeasurable	<ul style="list-style-type: none"> <li>• SVAP (Stream Visual Assessment Protocol – USDA/NRCS) – canopy cover</li> <li>• Riparian Wildlife Habitat Index</li> </ul>
<b><u>Water Quality</u> Harmful levels of pathogens in surface water</b>	Kinds and numbers of viruses, protozoa, and bacteria are present at a level that degrades surface water quality.	Materials that harbor pathogens are stored, handled, disposed of, applied, and managed such that surface water uses are not adversely affected.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Client interview</li> <li>• Caribbean Area AWMS Design Worksheet</li> <li>• National Engineering Handbook, Part 651, Ag. Waste Mgt. Field Handbook</li> </ul>

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<b>WATER</b>				
<b><u>Water Quality</u></b> <b>Harmful levels of petroleum in surface water</b>	Fuel, oil, gasoline and other hydrocarbons present in toxic amounts degrade surface water quality.	Petroleum products are used, stored, handled, and disposed of such that surface water uses are not adversely affected.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Client interview</li> </ul>

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<b>AIR</b>				
<b><u>Air Quality</u> Ammonia (NH3)</b>	Animal waste and inorganic commercial fertilizers emit ammonia that contributes to odor.	Land use and management operations comply with requirements of all applicable federal, state, and local regulations.	Pounds/year – average annual pounds of reduced NH <sub>3</sub> emissions for the field or planning area/unit	<ul style="list-style-type: none"> <li>• Approved NRCS technical guidance and tools</li> </ul>
<b><u>Air Quality</u> Chemical drift</b>	Materials applied to control pests drift downwind and contaminate/injure non-targeted fields, crops, soils, water, animals and humans.	Land use and management operations reduce chemical drift in to the atmosphere and comply with all applicable federal, state, and local regulations, and applicable label directions.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Approved NRCS technical guidance and tools</li> <li>• Pesticides application record</li> <li>• Pesticides labels</li> <li>• WIN-PST</li> </ul>
<b><u>Air Quality</u> Objectionable odors</b>	Land use and management operations produce offensive smells.	Odor-producing facilities and activities are planned and sited to mitigate potential nuisance impacts and meets all applicable, state, and local regulations.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Olfactory assessment</li> <li>• National Engineering Handbook, Part 651, Ag. Waste Mgt. Field Handbook (AWMFH)</li> <li>• NRCS approved tools</li> </ul>
<b><u>Air Quality</u> Undesirable air movement</b>	Wind velocities (too little or too much) reduce animal or plant productivity, impact human comfort and increase energy consumption.	Devices and practices are sited and planned to mitigate excess or deficient air movement.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Anemometers</li> <li>• Approved NRCS technical guidance and tools</li> <li>• National Engineering Handbook, Part 651, Ag. Waste Mgt. Field Handbook (AWMFH)</li> </ul>
<b><u>Air Quality</u> Adverse air temperature</b>	Air temperatures (too hot) reduce animal or plant productivity, impact human comfort and increase energy consumption.	Devices and practices are planned and sited to mitigate temperature extremes.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Heat indices</li> <li>• Air temperature assessment</li> </ul>

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<b>PLANTS</b>				
<p><b>Plants not adapted or suited</b></p>	<p>Plants are not adapted and/or suited to site conditions or client objectives.</p>	<p>Selected plants are adapted to the soil and climatic conditions or the site is modified to make it suitable for the desired plants. Plants are sustainable, do not negatively impact other resources, and meet client objectives. For specific land uses, additional criteria apply:  <b>Cropland:</b> A healthy stand with vigorous growth. Yields 75% of client expectations.  <b>Pastureland:</b> Plants on or planned for the site have a site adaptation score greater than 3 using Tropical Pasture Condition Score sheet and applicable Forage Suitability Groups (FSG) reports.  <b>Hayland:</b> Plants on or planned for the site are listed in applicable Forage Suitability Groups reports.  <b>Forestland/Agroforest:</b> Plants on or planned for the site are listed in Ecological Site Descriptions (ESD).</p>	<p>Nonmeasurable</p>	<ul style="list-style-type: none"> <li>• On-site investigation and records</li> <li>• Forage Suitability Groups</li> <li>• Client interview</li> <li>• PLANTS database</li> <li>• VEGSPEC</li> <li>• Seeding and Planting Guide</li> <li>• Soil pH, drainage class, sodium adsorption ratio (SAR) and electrical conductivity (EC) suitability ranges.</li> <li>• Soil interpretations – Section II</li> <li>• Agronomy Handbook supplement</li> <li>• Agricultural Experiment Station and Cooperative Extension Service agronomic technical guidance</li> <li>• Soil survey interpretation report</li> <li>• Ecological Site Descriptions (ESD)</li> <li>• NRCS discipline manuals/handbooks</li> <li>• Caribbean Area Grasses Identification Guide</li> <li>• Wetland Plants in the Caribbean Area</li> <li>• Common Resource Areas</li> <li>• Tropical pasture condition score sheet</li> </ul>

**Caribbean Area Resource Concerns and Quality Criteria**

Natural Resource Concern	Description of Concern	State Quality Criteria	Measurement Units	Assessment Tools for Quality Criteria Evaluation
<b>PLANTS</b>				
<p><b>Plant Condition Productivity, health and vigor</b></p>	<p>Plants do not produce the yields, quality, and soil cover to meet client objectives.</p>	<p>Selected plants on or planned for the site are sufficiently productive to meet or exceed client needs. For specific land uses, additional criteria apply:  <b>Cropland:</b> A healthy stand with vigorous growth produces at least 75% of site potential.  <b>Pastureland:</b> Forage yields are at least 75% of high management estimates cited in FSG reports.  <b>Hayland:</b> Forage yields at least 75% of high management estimates cited in Forage Suitability Groups (FSG) reports.  <b>Forestland/Agroforest:</b> Forests consist of healthy stands with vigorous growth having a stand density within 25% of optimum stocking on a stems/acre basis. Plants chosen for agroforest applications are consistent with tree and shrub performance.</p>	<p>Nonmeasurable</p>	<ul style="list-style-type: none"> <li>• Agronomy Handbook supplement</li> <li>• Client interview</li> <li>• Plant tissue and harvest analysis</li> <li>• Crop scouting</li> <li>• NRCS discipline manuals/handbooks</li> <li>• National Range and Pasture Handbook</li> <li>• Ecological Site Descriptions</li> <li>• Forage Suitability Groups</li> <li>• Electronic probe calibrated for the forage mixture, or a clip and weigh sampling procedure</li> <li>• Plot sampling of understory vegetation</li> <li>• Soil survey interpretation report</li> <li>• Soil Testing</li> <li>• Crop/soil yield comparison in the vicinity</li> <li>• Keys for disease and insect symptoms</li> <li>• Keys for nutrient deficiencies, toxicities, and other conditions</li> <li>• Stocking rate of desired species</li> <li>• Stocking measurement for the tree stands</li> <li>• Caribbean Area Grasses Identification Guide</li> <li>• Wetland Plants in the Caribbean Area</li> <li>• Common Resource Areas</li> </ul>

**Caribbean Area Resource Concerns and Quality Criteria**

Natural Resource Concern	Description of Concern	State Quality Criteria	Measurement Units	Assessment Tools for Quality Criteria Evaluation
<b>PLANTS</b>				
<p><b><u>Plant Condition</u></b>  <b>Threatened or endangered plant species: Plant species listed or proposed for listing under the Endangered Species Act</b></p>	<p>The sites include individuals, habitat or potential habitats for one or more plant species listed or proposed for listing under the Endangered Species Act.</p>	<p>Populations and/or habitats of threatened and endangered plant species are managed to maintain, increase or improve current populations, health, or sustainability.</p>	<p>Nonmeasurable</p>	<ul style="list-style-type: none"> <li>• Client interview</li> <li>• Inventory site</li> <li>• General Manual, 190, Part 410</li> <li>• US Fish and Wildlife Service endangered species lists</li> <li>• Local endangered species lists</li> <li>• Federal and state endangered species rules and regulations</li> <li>• Consultation with appropriate federal, state, and local agencies/groups</li> <li>• PLANTS Website</li> <li>• Caribbean Area Grasses Identification Guide</li> <li>• Wetland Plants in the Caribbean Area</li> <li>• Common Resource Areas</li> </ul>
<p><b><u>Plant Condition</u></b>  <b>Threatened or endangered plant species, declining species, species of concern</b></p>	<p>The site includes individuals, habitat or potential habitat for one or more plant species that the state government with jurisdiction, or the State Technical Committee, has identified as a species of concern. This includes plant species which have been identified as candidates for listing under the Endangered Species Act.</p>	<p>Populations and/or habitats of plant species of concern are managed to maintain increase or improve current populations, health, or sustainability.</p>	<p>Nonmeasurable</p>	<ul style="list-style-type: none"> <li>• Client interview</li> <li>• Inventory site</li> <li>• General Manual, 190, Part 410</li> <li>• US Fish and Wildlife Service county endangered species lists</li> <li>• Local endangered species lists</li> <li>• Federal and state endangered species rules and regulations</li> <li>• Consultation with appropriate federal, state, and local agencies/groups</li> <li>• PLANTS Website</li> <li>• Caribbean Area Grasses Identification Guide</li> <li>• Wetland Plants in the Caribbean Area</li> <li>• Common Resource Areas</li> </ul>

**Caribbean Area Resource Concerns and Quality Criteria**

Natural Resource Concern	Description of Concern	State Quality Criteria	Measurement Units	Assessment Tools for Quality Criteria Evaluation
<b>PLANTS</b>				
<b><u>Plant Condition</u></b> <b>Noxious and invasive plants</b>	The site has noxious or invasive plants present.	The site is managed to control noxious and invasive plants and to minimize their spread.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Client interview</li> <li>• Inventory site</li> <li>• Consultation with appropriate federal, state, and local agencies/groups</li> <li>• State or local noxious weed list</li> <li>• PLANTS Website</li> <li>• Caribbean Area Grasses Identification Guide</li> <li>• Wetland Plants in the Caribbean Area</li> </ul>
<b><u>Plant Condition</u></b> <b>Forage quality and palatability</b>	Plants do not have adequate nutritive value or palatability for the intended use.	Forage plants are managed to produce the desired nutritive value and palatability for the intended use.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Plant tissue analysis</li> <li>• Caribbean Area Grasses Identification Guide</li> <li>• Wetland Plants in the Caribbean Area</li> <li>• Common Resource Areas</li> </ul>
<b><u>Plant Condition</u></b> <b>Wildfire hazard</b>	The kinds and amounts of fuel loadings (plant biomass) pose risks to human safety, structures, and resources should wildfire occur.	Fuel loadings are reduced and/or isolated to meet client needs in minimizing the risk and incidence of wildfire.	Acres/year – average annual acres protected from wildfire for the field of planning area/unit	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Site and flammable biomass inventories</li> <li>• Aerial photo analysis</li> <li>• Caribbean Area Grasses Identification Guide</li> <li>• Wetland Plants in the Caribbean Area</li> <li>• Common Resource Areas</li> </ul>

## Caribbean Area Resource Concerns and Quality Criteria

Natural Resource Concern	Description of Concern	State Quality Criteria	Measurement Units	Assessment Tools for Quality Criteria Evaluation
<b>ANIMALS</b>				
<b><u>Fish and Wildlife</u> Inadequate food</b>	Quantity and quality of food are unavailable to meet the life history requirements of the species or guild of species of concern.	Food availability meets the life history requirements of the species or guild of species of concern.	Nonmeasurable; based on habitat evaluation guide	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Aerial photo analysis</li> <li>• Caribbean Area Wildlife Habitat Evaluation Guide</li> <li>• National Biology Handbook</li> <li>• Soil survey interpretation report</li> </ul>
<b><u>Fish and Wildlife</u> Inadequate cover/shelter</b>	Cover/shelter for the species or guild of species of concern is unavailable or inadequate. This includes lack of hiding, thermal, and/or refuge cover.	The ecosystem or habitat types support the necessary plant species in adequate diversity, abundance, and physical structure; and the connectivity of fish and wildlife cover is adequate to support, over time, the species or guild of species of concern.	Nonmeasurable; based on habitat evaluation guide	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Inventory of cover/shelter</li> <li>• Aerial photo analysis</li> <li>• Caribbean Area Wildlife Habitat Evaluation Guide</li> <li>• National Biology Handbook</li> <li>• Soil survey interpretation report</li> </ul>
<b><u>Fish and Wildlife</u> Inadequate Water</b>	The quantity and quality of water is unacceptable for the species or guild of species of concern.	The quantity and quality of water meets the life history requirements of the species or guild of species of concern.	Nonmeasurable; based on habitat evaluation guide	<ul style="list-style-type: none"> <li>• Stream Visual Assessment Protocol</li> <li>• Inventory of water supplies</li> <li>• Aerial photo analysis</li> <li>• Caribbean Area Wildlife Habitat Evaluation Guide</li> <li>• National Biology Handbook</li> </ul>
<b><u>Fish and Wildlife</u> Inadequate space</b>	Lack of areas disrupts life history requirements of the species or guild of species of concern.	Area is adequate to meet life history requirements of the species or guild of species of concern. (Examples: staging areas for rest and feeding, lekking areas for breeding, migratory movement corridors).	Nonmeasurable; based on habitat evaluation guide	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Stream Visual Assessment Protocol</li> <li>• Inventory of space/areas</li> <li>• Aerial photo analysis</li> <li>• Caribbean Area Wildlife Habitat Evaluation Guide</li> <li>• National Biology Handbook</li> <li>• Stream Corridor Restoration Manual</li> </ul>
<b><u>Fish and Wildlife</u> Habitat fragmentation</b>	Habitat has insufficient structure, extent, and connectivity to provide ecological functions and/or achieve management objectives.	Fish and wildlife habitats are connected and are maintained sufficiently to support the species or guild of species of concern.	Nonmeasurable; based on habitat evaluation guide	<ul style="list-style-type: none"> <li>• Stream Visual Assessment Protocol</li> <li>• Aerial photo analysis</li> <li>• Caribbean Area Wildlife Habitat Evaluation Guide</li> <li>• National Biology Handbook</li> <li>• Stream Corridor Restoration Manual</li> </ul>

**Caribbean Area Resource Concerns and Quality Criteria**

Natural Resource Concern	Description of Concern	State Quality Criteria	Measurement Units	Assessment Tools for Quality Criteria Evaluation
<b>ANIMALS</b>				
<p><b><u>Fish and Wildlife Threatened and endangered fish and wildlife species: Fish and wildlife species listed or proposed for listing under the Endangered Species Act</u></b></p>	<p>The site includes individuals, habitat or potential habitat for one or more fish or wildlife species listed or proposed for listing under the Endangered Species Act.</p>	<p>Populations and/or habitats of threatened and endangered fish and wildlife species and/or habitats they occupy are managed to maintain, increase or improve current population, health, or sustainability.</p>	<p>Nonmeasurable</p>	<ul style="list-style-type: none"> <li>• Client interview</li> <li>• Inventory of presence/absence of T&amp;E species</li> <li>• General Manual, 190, Part 410</li> <li>• US Fish and Wildlife Service county endangered species lists</li> <li>• Fish and wildlife recovery plans</li> <li>• Federal and state endangered species rules and regulations</li> <li>• Consultation with appropriate federal, state, and local agencies/groups</li> <li>• Fish and wildlife agency web sites</li> <li>• Local endangered species lists</li> </ul>
<p><b><u>Fish and Wildlife Threatened and endangered species: Declining species, species of concern</u></b></p>	<p>The site includes individuals, habitat or potential habitat for one or more fish or wildlife species that the state government with jurisdiction, or the State Technical Committee, has identified as a species of concern. This includes plant species which have been identified as candidates for listing under the Endangered Species Act.</p>	<p>Populations and/or habitats of fish and wildlife species of concern are managed to maintain, increase or improve current populations, health, or sustainability.</p>	<p>Nonmeasurable</p>	<ul style="list-style-type: none"> <li>• Client interview</li> <li>• Inventory of presence/absence of T&amp;E species</li> <li>• General Manual, 190, Part 410</li> <li>• US Fish and Wildlife Service county endangered species lists</li> <li>• Fish and wildlife recovery plans</li> <li>• Federal and state endangered species rules and regulations</li> <li>• Consultation with appropriate federal, state, and local agencies/groups</li> <li>• Fish and wildlife agency web sites</li> <li>• Local endangered species lists</li> </ul>

### Caribbean Area Resource Concerns and Quality Criteria

Natural Resource Concern	Description of Concern	State Quality Criteria	Measurement Units	Assessment Tools for Quality Criteria Evaluation
<b>ANIMALS</b>				
<b><u>Domestic Animals</u> Inadequate quantities and quality of feed and forage</b>	Total feed and forage is insufficient to meet the nutritional and production needs of the kinds and classes of livestock.	Feed and forage including supplemental nutritional requirements are provided to meet production goals for the kinds and classes of livestock. Native grazers are factored into the total feed and forage balance computations.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Measured inventory</li> <li>• National Range and Pasture Handbook</li> <li>• Forage quality laboratory analysis</li> <li>• Other state adapted forage/livestock management software and job sheets</li> <li>• Pasture Suitability Groups</li> </ul>
<b><u>Domestic Animals</u> Inadequate shelter</b>	Livestock are not protected sufficiently to meet the production goals for the kinds and classes of livestock.	Artificial and/or natural shelter is provided to meet production goals for the kinds and classes of livestock.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Inventory of facilities and their capacities</li> <li>• Aerial photo analysis</li> <li>• National Range and Pasture Handbook</li> </ul>
<b><u>Domestic Animals</u> Inadequate stock water</b>	The quantity, quality and distribution of drinking water are insufficient to meet the production goals for the kinds and classes of livestock.	Sufficient water of acceptable quality is provided and adequately distributed to meet production goals for the kinds and classes of livestock. To reduce potential for water contamination, watering facilities are constructed or modified to minimize mortality to wildlife.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Visual assessment</li> <li>• Inventory of distribution needs</li> <li>• Aerial photo analysis</li> <li>• National Range and Pasture Handbook</li> </ul>
<b><u>Domestic Animals</u> - Stress and mortality</b>	Animals exhibit illness or death from disease, parasites, insects, poisonous plants, or other factors.	Land and water use and management are consistent with activities conducted to alleviate stress and mortality factors.	Nonmeasurable	<ul style="list-style-type: none"> <li>• Animal health/mortality alerts</li> <li>• State and local biosecurity protocols</li> <li>• State and local standards for dead animal disposal</li> </ul>