

NRCS-Alaska Technical Guide
Section III
Quality Criteria – Soil

Natural Resource Concern	Description of Concern	State Quality Criteria	Assessment Tools for Quality Criteria Evaluation	Measurement Units
SOIL				
Soil Erosion - Sheet and Rill	Detachment and transport of soil particles caused by rainfall splash and runoff degrade soil quality.	Average Annual Sheet and rill erosion does not exceed the Soil Loss Tolerance "T".	<ul style="list-style-type: none"> • Visual assessment (pedestals, rills) • Erosion-bridge method; erosion meters • Special inventory methods (e.g., Rangeland Health Evaluation Worksheet) • RUSLE2 	Tons/Acre/Year - average annual tons of erosion reduced per acre for the field or planning area/unit
Soil Erosion - Wind	Detachment and transport of soil particles caused by wind degrade soil quality and/or damage plants.	Average Annual wind erosion does not exceed the Soil Loss Tolerance "T". or, for plant damage, does not exceed Crop Damage Tolerances.	<ul style="list-style-type: none"> • Visual assessment (pedestals, blow-out areas) • Special inventory methods (e.g., Rangeland Health Evaluation Worksheet) • Erosion prediction tool, i.e., Wind Erosion Equation (WEQ) 	Tons/Acre/Year - average annual tons of erosion reduced per acre for the field or planning area/unit
Soil Erosion - Ephemeral Gully	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.	<ul style="list-style-type: none"> • Visual assessment • Volume calculation • EGEM 	Tons/Year - average annual tons of erosion reduced for the field or planning area/unit
Soil Erosion - Classic Gully	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.	<ul style="list-style-type: none"> • Visual assessment • Volume calculation • Aerial photo trend analysis • TR20. TR55 (storm event q-runoff) • Client interview • Geologic investigation 	Tons/Year - average annual tons of erosion reduced for the field or planning area/unit

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Soil Erosion - Streambank	Accelerated loss of streambank soils restricts land and water use and management.	Accelerated streambank erosion is stabilized to a level that does not negatively impact the normal geomorphic processes nor restrict the use or management of adjacent land, water or structures.	<ul style="list-style-type: none"> • Visual assessment, e.g., Stream Visual Assessment Protocol, Proper Functioning Condition (PFC) • Aerial photo trend analysis • Engineering Field Handbook, Chapter 16 • Client interview • Lateral recession rate procedure • Geologic investigation, including stream geomorphology • Channel stability evaluation 	Tons/Year - average annual tons of erosion reduced for the field or planning area/unit
Soil Erosion - Shoreline	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.	<ul style="list-style-type: none"> • Visual assessment • Aerial photo trend analysis • Volume calculation • Erosion transects/pins • Client interview 	Tons/Year - average annual tons of erosion reduced for the field or planning area/unit
Soil Erosion – Irrigation-induced	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”.	<ul style="list-style-type: none"> • SRFR (Surface Irrigation Model) • CPED (Center Pivot Evaluation and Design) • NRCS National and State Irrigation Guides 	Tons/Acre/Year - average annual tons of erosion reduced per acre for the field or planning area/unit
Soil Erosion - Mass Movement	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 restrict the use or management of adjacent land, water, or structures.	<ul style="list-style-type: none"> • Visual assessment • Aerial photo trend analysis • Volume calculation • Geologic investigation 	Tons/Year - average annual tons of erosion reduced for the field or planning area/unit

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Soil Erosion – Road, road sides and Construction Sites	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.	<ul style="list-style-type: none"> • Visual assessment • Volume Calculation • Water and wind erosion prediction tools (RUSLE2 and WEQ) • WEPP 	Tons/Year - average annual tons of erosion reduced for the field or planning area/unit
Soil Condition - Organic Matter Depletion	Soil organic matter has or will diminish to a level that degrades soil quality.	Soil Conditioning Index is positive.	<ul style="list-style-type: none"> • Soil Conditioning Index • Soil Quality Kit • Soil testing and analysis 	Soil Conditioning Index improvement - positive improvement in index for the field or planning area/unit

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Soil Condition – Rangeland Site Stability	The capacity to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water.	Indicators of Rangeland Health Attribute rating for Soil/Site Stability show Slight to Moderate or less departure from Ecological Reference Sheet (ESD).	<ul style="list-style-type: none"> • Rangeland Health Assessment 	Departure from Ecological Reference Sheet (ESD) categories – amount of departure, by numeric value, from Ecological Reference Sheet for the field or planning area/unit. 1=None to Slight, 2=Slight to Moderate, 3=Moderate, 4=Moderate to Extreme, or 5=Extreme.
Soil Condition - Compaction	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.	<ul style="list-style-type: none"> • Assessment of plant root systems • Bulk density test-Soil Quality Kit • Dial penetrometer • Visual assessment 	Non measurable
Soil Condition - Subsidence	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.	<ul style="list-style-type: none"> • Visual assessment • Inventory of volume and depth • Soil probes and witness poles 	Inches/Acre/Year - average annual inches of subsidence reduced per acre for the field or planning area/unit

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Soil Condition - Contaminants - Salts and Other Chemicals	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 HARMFULL levels for plants or animals.	<ul style="list-style-type: none"> • Soil test • Soil Quality Kit- EC meter • Visual assessment 	Electrical Conductivity (EC) – average reduction in EC for the field or planning area/unit
Soil Condition - Contaminants - Animal Waste and Other Organics - N	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.	<ul style="list-style-type: none"> • Soil test • Plant tissue test • Application records • Yield records/history 	Pounds/Acre/Year - average annual pounds of nitrogen (N) reduced per acre for the field or planning area/unit
Soil Condition - Contaminants - Animal Waste and Other Organics - p	Phosphorus nutrient levels from applied animal waste and other organics restrict desired use of the land.	Phosphorus nutrient application levels do not exceed soil storage/plant uptake capacities based on soil test recommendations and risk analysis results.	<ul style="list-style-type: none"> • Soil test • Plant tissue test • Phosphorus Index • Application records • Yield records/history 	Pounds/Acre/Year - average annual pounds of phosphorus (P) reduced per acre for the field or planning area/unit
Soil Condition - Contaminants - Animal Waste and Other Organics - K	Potassium nutrient levels from applied animal waste and other organics restrict desired use of the land.	Potassium nutrient application levels do not exceed soil storage/plant uptake capacities based on soil test recommendations and risk analysis results.	<ul style="list-style-type: none"> • Soil test • Plant tissue test • Application records • Yield records/history 	Pounds/Acre/Year - average annual pounds of potassium (K) reduced per acre for the field or planning area/unit
Soil Condition – Contaminants - Commercial Fertilizer - N	Over application of nitrogen degrades plant health and vigor, or exceeds the soil capacity to retain nutrients.	Soil nutrient levels of nitrogen do not exceed crop needs based on realistic yield goals and appropriate pH levels are maintained.	<ul style="list-style-type: none"> • Soil Test • Soil Quality Kit-pH meter 	Pounds/Acre/Year - average annual pounds of nitrogen (N) reduced per acre for the field or planning area/unit

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Soil Condition – Contaminants - Commercial Fertilizer - P	Over application of phosphorus degrades plant health and vigor, or exceeds the soil capacity to retain nutrients.	Soil nutrient levels of phosphorus do not exceed crop needs based on realistic yield goals and appropriate pH levels are maintained.	<ul style="list-style-type: none"> • Soil Test • Phosphorus Index • Soil Quality Kit-pH meter 	Pounds/Acre/Year - average annual pounds of phosphorus (P) reduced per acre for the field or planning area/unit
Soil Condition – Contaminants - Commercial Fertilizer - K	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.	<ul style="list-style-type: none"> • Soil Test • Soil Quality Kit-pH meter 	Pounds/Acre/Year - average annual pounds of potassium (K) reduced per acre for the field or planning area/unit
Soil Condition - Contaminants - Residual Pesticides	Residual pesticides in the soil have an adverse effect on non-targeted plants and animals.	Pesticides are applied, stored, handled, and disposed of so that residues in the soil do not adversely affect non-targeted plants and animals.	<ul style="list-style-type: none"> • Visual assessment • WIN-PST • NAPRA • Soil test • Plant and animal tissue test 	Non Measurable
Soil Condition - Damage from Sediment Deposition	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.	<ul style="list-style-type: none"> • Visual assessment • Volume calculation • Current water and wind erosion prediction tools (RUSLE2 and WEQ) coupled with sediment delivery ratios • Photographic interpretation 	Acres/Year - average annual acres of sediment deposition reduced for the field or planning area/unit