

B. WATER

B.1. Quantity

B.1.a Excess Amounts – Seeps

DEFINITION: Subsurface water flows onto the surface of the land.

Excess Amounts-Seeps Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Visual inspection		Seeps will be managed to solve discernable plant production, trafficability, slope stability, or concentrated flow erosion problems consistent with all federal, state, and local laws. Tools indicate the desired land use does not require management or maintenance more extensive than on the remaining treatment unit.
Soil Survey		
Irrigation evaluation		

B.1.b Excess Amounts - Runoff/Flooding

DEFINITION: Water accumulates on the surface of the land.

Excess Amounts-Runoff/Flooding Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Floodplain maps		Water will be controlled to the extent that there is no observable damage to land, crops, or structures. In those instances where management of excess surface water is restricted because of policy and laws such as those pertaining to wetlands and riparian areas, the criteria will be met if policy and laws are followed. Tools and observation will use a 2 year-24 hour storm event for assessment
Soil Survey		
Visual Inspection		
Flood hazard study		
NRCS National Engineering Handbook		
TR-20		
TR-55		

B.1.c Excess Amounts - Excess Subsurface Water

DEFINITION: Subsurface water accumulates in the soil profile, which adversely affects plant growth and production operations.

Excess Subsurface Water Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Visual inspection		Conservation practices are applied to solve discernable plant production and water quality problems consistent with all applicable federal, state, and local laws. Tools and observation indicate subsurface water does not restrict operational activities or cause discernable reduction in plant production.
Permafrost Maps		
Soil Survey		
NRCS National Engineering Handbook		
Irrigation evaluation		

B.1.d Inadequate Outlets

DEFINITION: Water conveyance channels and structures to collect and remove water from the land restrict the desired use of the land.

Inadequate Outlets Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Soil investigation		All water discharges are safely disposed of through stable outlets of adequate capacity and do not cause erosion, incised channels, unplanned deposition, or excess ponding of water. Tools and observation will use a 2 year-24 hour storm event for assessment.
Geologic investigation		
Hydrologic calculation		
Visual inspection		

B.1.e Water Management for Irrigated Land (includes supplemental irrigation, leaching, and frost protection).

DEFINITION: Inefficient and/or untimely utilization of existing water supplies restricts the desired use of the land.

Water Management for Irrigated Lands Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Farm Irrigation Rating Index (FIRI) Management factors, system management, scheduling/soil moisture, irrigation skill and action, maintenance, and soil condition shall be determined.	Sprinkler/Trickle Irrigation: <ul style="list-style-type: none"> Quality Criteria is met when the product of these factors is greater than or equal to 0.80 of the potential efficiency as presented in the Alaska Irrigation Guide. 	Water is applied at an amount and timeliness to meet the needs of the crop. The management of the irrigation system shall be at a level to insure adequate irrigation water management is being applied under the control of the irrigator. When water delivery is beyond the irrigator's control, it is not considered when evaluating whether or not Quality Criteria is being met for irrigation water management.
(SRFR) – Surface Irrigation Simulation Model Management factors, system management, scheduling/soil moisture, irrigation skill and action, maintenance, and soil condition shall be determined.	Surface Irrigation: <ul style="list-style-type: none"> Quality Criteria is met when the product of these factors is greater than or equal to 0.80 of the potential efficiency as presented in the Alaska Irrigation Guide. 	

B.1.f Water Management for Non-irrigated Land

DEFINITION: Inefficient management of precipitation and soil moisture restricts the desired use of the land.

Water Management for Non-Irrigated Land Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Yield Records		Management provides optimum use of natural moisture for the intended land use and is in balance with expected seasonally available moisture. It includes management and practices directed at trapping snow, increasing infiltration and decreasing evapotranspiration that comply with pertinent local, state, and federal laws, rules, and regulations. Tools and observations indicate land manager is utilizing localized precipitation and soil moisture to meet objectives and yields are comparable to other dryland operation in the area.
Soil moisture test		
Visual inspection		

B.1.g-h Restricted Capacity from Sediment Deposition in Small Water Conveyance - ONSITE, OFFSITE.

DEFINITION:

ONSITE-Onfarm water quantity that affects onfarm drainage ditches, road ditches, culverts, and canals.

OFFSITE-Water quantity that affects drainage ditches, road ditches, culverts, and canals. Offsite practice effects are generally less than onsite because of increased distance.

Onsite & Offsite Restricted Capacity from Sediment Deposition Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Measurements of loss of capacity		Onsite and offsite capacities are restored, conveyances are maintained at design flow capacity, and the treated area does not contribute to the identified problem. Criteria will be consistent with policy and laws such as those pertaining to wetlands. Tools and observation identify sediment source areas and treat to meet quality criteria for soil erosion. Excessive sediment loads are controlled by the treatment methods selected.
Visual estimates of loss of capacity		

B.1.i. Restricted Capacity from Sediment Deposition - Water Bodies, Streams, and Lakes.

DEFINITION: Water quantity that is affected because of the loss of storage capacity as well as the loss of conveyance capacity.

Restricted Capacity for Sediment Deposition Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative

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Measurements of loss of capacity		Loss of storage and/or conveyance capacity does not exceed designed or expected rates. Sediment source areas or potential source areas are identified and treated. Tools and observation identify sediment source areas and treat to meet quality criteria for soil erosion. Excessive sediment loads are controlled by the treatment methods selected.
Visual estimates of loss of capacity		

B.2. Water Quality

B.2.a Ground Water Contaminants – Pesticides

Definition: Water pollution problems from pesticides. Pesticide means “all” chemicals used to manage weeds, insects, and diseases. Pesticides degrade beneficial uses of ground water for human consumption, wildlife species, livestock watering or irrigation.

Pesticide Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Windows Pesticide Screening Tool (WIN-PST)	Pesticide Interaction Loss Potential Leaching rating of Low or Very Low	Pesticides are applied following label instructions and pertinent local, state, and federal regulations. Pesticides are selected to minimize adverse environmental effects and applied in forms, at rates and during times so no significant contamination occurs below the root zone. Use risk analysis tools to select pesticides that minimize adverse environmental effects and to determine need for mitigating practices so no significant contamination occurs below the root zone
Pesticide Storage, Handling and Disposal Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Farm*a*Syst		Pesticides are stored and disposed of following pertinent local, state, and federal regulations. Pesticides are stored, handled, and disposed of to minimize risk of accidental spill or leakage.

B.2.b Ground Water Contaminants - Nutrients, Organics, and Animal Wastes

DEFINITION: Water pollution problems from natural or human-induced common nutrients of N, P, K, Ca, Na, and Mg and from animal and other wastes. Application of commercial fertilizers and animal wastes degrade beneficial uses of groundwater for human consumption or livestock and wildlife watering.

Ground Water Contaminants-Nutrients and Organics Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Soil test	Agronomic rates	Commercial fertilizers and animal wastes are stored, applied, and disposed of following pertinent local, state, and federal regulations so that ground water standards are not violated. Application of nutrients and organics are in balance with plant requirements considering all nutrient sources, soil characteristics, realistic yield goals, and climatic factors. Federal, state, and local laws will be followed. Nutrients or animal wastes are applied at rates, forms, and times so no excessive leachate containing nutrients occurs below the root zone. Assume pathogens have the same potential for polluting groundwater as nitrate. Use tools to determine if nutrients and/or animal wastes are applied at rates, forms, and times along with mitigating practices so no excessive leachate containing nutrients occur below the root zone.
Phosphorus Index	Balance for P if appropriate	
Leaching Index	Monthly LI <=2	
Agricultural Waste Management Field Handbook	Use book values	
Fertilizer Storage and Handling Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Farm*a*Syst		Commercial fertilizers are stored, handled, and disposed of to minimize risk of accidental spill or leakage.
Livestock Waste Storage Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Livestock Waste Storage Analysis – Use NRCS Agricultural Waste Management Field Handbook for guidance		Livestock waste storage facilities must be adequate to prevent significant loss from leaching and appropriately sized to safely store waste through environmentally unsafe periods to apply.
Livestock Confinement Area Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Visual inspection and soils analysis		Livestock Confinement Area - Livestock confinement areas are to be managed to minimize risk of leaching nitrate and pathogenic contaminants.

B.2.c. - Salinity

DEFINITION: Salts such as sodium, calcium, potassium, boron, and selenium over naturally occurring rates degrade beneficial uses of ground and surface water for human, wildlife, or livestock consumption, for irrigating crops, for freshwater aquatic plants and animals, and cause corroding of equipment.

Ground Water Contaminants-Salinity Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Alaska Irrigation Guide	Crop tolerance for specific crops	Electrical conductivity can be used as an indicator of excessive salinity or total dissolved salts. Taste can be used as an indicator in lieu of testing for total dissolved salts for drinking water. Salts reaching the ground water aquifers or surface water bodies do not exceed allowable standards established by federal, state, and local laws. Treated areas do not contribute contaminants at a level that adversely affects the groundwater or moves contaminant below the root zone.
Soil test (Electrical Conductivity-Ec)		
Client Interview	Increased salinity should not reduce agronomic crop yields by more than 10 percent	
Water test (Electrical Conductivity-Ec)	Drinking water 0.7 dS/M Plants 3.0 dS/M or crop tolerance	

B.2.d. - Heavy Metals and Other Organics

DEFINITION: Beneficial uses of ground and surface water are degraded by induced metals or metal compounds such as chromium, iron, lead, zinc, copper, and cobalt over naturally occurring rates or by the application of other organic wastes in municipal or industrial sludge (biosolids). Excessive concentrations of heavy metals can be toxic to humans, plants, and animals. Organics introduced from municipal or industrial sludge may affect taste, color, and safety of water used by humans and animals.

Ground Water Contaminants-Heavy Metals & Other Organics Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Management plan and NPDES permit		Heavy metals and organics reaching a ground water aquifer or surface water body do not exceed allowable standards established by federal, state, and local laws. A state approved biosolids and domestic septage management plan and NPDES permit for the site is required in order to meet quality criteria. Compliance with any state or EPA management plans, NPDES permits and/or other local, state, and federal regulations is required to meet quality criteria.

B.2.e. Pathogens

DEFINITION: Pathogens such as bacteria, viruses, protozoans, parasites or fungi associated with animal wastes or animal health problems associated with beneficial uses of ground water.

Ground Water Contaminants- Pathogens Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
See nutrient indicator tools and nutrient criteria to determine if animals wastes are managed so there is no significant delivery of pathogens to ground water bodies		Pathogens reaching a ground water aquifer do not exceed allowable standards established by federal, state, or local laws, rules, and regulations.

B.2.f. Petroleum Products

DEFINITION: The quality of ground water and surface water can be severely degraded by contamination of petroleum products. In addition to health and safety, contamination of soil or water can result in expensive fines and the liability for clean up.

Petroleum Products Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Visual inspections and soil analysis		The quality of ground water and surface water can be severely degraded by contamination of petroleum products. In addition to health and safety, contamination of soil or water can result in expensive fines and the liability for clean up.

B.2.g Surface Water Contaminants – Pesticides

DEFINITION: Surface water pollution problems from pesticides. Pesticide means “all” chemicals used to manage weeds, insects, and diseases. Pesticides degrade beneficial uses of surface water by endangering human health, livestock and wildlife health, and aquatic life (plants and animals).

Surface Water Contaminants-Pesticides Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Windows Pesticide Screening Tool (WIN-PST)	Pesticide Interaction Loss Potential Solution and Adsorbed Runoff rating of Low or Very Low	Pesticides are selected to minimize adverse environmental effects and applied in form, at rates and during times so no significant transport occurs beyond the edge of the field. Pesticides are applied according to the label directions and all federal, state, and local laws. Use risk analysis tools to select pesticides that minimize adverse environmental effects and to determine need for mitigating practices so no significant contamination occurs beyond the edge of the field.

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Pesticide Storage, Handling and Disposal Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Farm*a*Syst		Pesticides are stored, handled, and disposed of to minimize risk of accidental spill or leakage.

B.2.h Surface Water Contaminants - Nutrients and Organics and Animal Wastes

DEFINITION: Surface water pollution problems that result from the use of all applied plant nutrients, including animal and other wastes. Application of commercial fertilizers and animal wastes degrade beneficial uses of surface water for human consumption and safety, for livestock watering, and to support aquatic life (animals and plants).

Surface Water Contaminants Nutrients, Organics, and Animal Wastes Field Application Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Soil test	Agronomic rates	Nutrients or animal wastes are applied at rates, forms, and times so no significant runoff or subsurface flows containing nutrients or pathogens occurs beyond field boundaries. Assume pathogens have the same potential for polluting surface water as nitrate. Application of nutrients and organics are in balance with plant requirements considering all nutrient sources, soil characteristics, optimum yields, runoff loss potential of nutrients dissolved in the runoff water and/or attached soil particles transported by water and wind, and proximity to the water body. Commercial fertilizers and animal wastes are stored, applied, and disposed of following pertinent local, state, and federal regulations so that surface water standards are not violated. No significant runoff or subsurface flows containing nutrients or animal wastes occurs beyond field boundaries.
Manure or other waste testing	Agronomic rates	
Phosphorus Index	Balance for P if appropriate	
Client Interview		
Agricultural Waste Management Field Handbook (AWMFH)	Use book values only when test values are not available	
NRCS Water Quality Indicators Guide: Surface Waters-Field Sheet 2B	Good Rating	
Fertilizer Storage and Handling Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Farm*a*Syst		Commercial fertilizers are stored, handled, and disposed of to minimize risk of accidental spill or leakage.
Livestock Waste Storage Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Livestock Waste Storage Analysis – Use NRCS Agricultural Waste Management Field Handbook for guidance		Livestock waste storage facilities must be adequate to prevent significant loss from surface loss and appropriately sized to safely store waste through environmentally unsafe application periods.

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Livestock Confinement Area Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Visual inspection and soils analysis		Livestock confinement areas are to be managed to minimize risk of contaminated runoff of nitrate and pathogenic contaminants.

B.2.i. Surface Water Contaminants Suspended Sediments and Turbidity

DEFINITION: Beneficial uses of surface water are degraded because of excessive sedimentation and turbidity which can be deleterious to fish or other aquatic life or injurious to public health, recreation, and industry.

Surface Water Contaminants - Sediment/Turbidity Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Sediment and Turbidity Worksheet	Low to Moderate Risk	Observation, tools and soil erosion criteria are used to determine whether soils, organic wastes, drains, ditches and streams are managed so there is no excessive delivery of sediments or organics to surface water bodies. Sedimentation and turbidity must meet surface water quality standards established by federal, state, or local regulations. Quality criteria for soil erosion sheet and rill, wind, concentrated flow, classic gully, streambank, irrigation-induced, soil mass movement, roadbanks, construction sites or scour areas should be met in order to control sediment.
NRCS Water Quality Indicators Guide: Surface Waters-Field Sheet 1B	Good rating	

B.2.j. Surface Water Contaminants Low Dissolved Oxygen

DEFINITION: Beneficial uses of surface waters to support aquatic organisms including fish, invertebrates, and algae are negatively impacted by low levels of dissolved oxygen.

Surface Water Contaminants - Dissolved Oxygen Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Water Monitoring	State Standard-Temperature, DO, turbidity, nutrients, and sediments.	Dissolved oxygen levels meet or exceed standards established by federal, state or local regulations. Use monitoring data and observation to determine if water temperature, nutrients and organics, flow regime, sediment and turbidity and stream channel characteristics are managed to not contribute to low dissolved oxygen levels. Quality criteria for nutrients, sediment and turbidity, temperature, and aquatic habitat are used to indicate whether suitable dissolved oxygen levels exist.

B.2.k. Surface Water Contaminants Salinity

DEFINITION: Salts such as sodium, calcium, potassium, boron, and selenium and naturally occurring rates degrade beneficial uses by creating saline conditions.

Surface Water Contaminants - Salinity Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Water test	Drinking Water <0.7; Aquatic Plants < 3.0 dS/M; Crops < 3.0 dS/M or Crop Salt Tolerances	Salt content of runoff reaching surface water bodies do not exceed allowable standards established by federal, state, and local regulations.
Soil test		
Crop yield history	Increased salinity should not reduce agronomic crops yield by more than 10 percent.	
Alaska Irrigation Guide	Drinking Water <0.7; Aquatic Plants < 3.0 dS/M; Crops < 3.0 dS/M or Crop Salt Tolerances	

B.2.l. Surface Water Contaminants -Heavy Metals

DEFINITION: Beneficial uses of surface water are degraded by induced metals or metal compounds such as chromium, iron, lead, zinc, copper, and cobalt over naturally occurring rates or by the application of other organic wastes in municipal or industrial sludge (biosolids). Excessive concentrations of heavy metals can be toxic to humans, plants, and animals.

Surface Water Contaminants - Heavy Metal Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Soil test	State standards	The application of domestic sewage sludge (biosolids) to agricultural lands is highly regulated. Compliance with any state or EPA management plans, NPDES permits and/or other local, state, and federal regulations is required to meet quality criteria. The potential for heavy metals and organics reaching a surface water body do not exceed allowable standards established by federal, state and local laws.
Biosolids Test	State standards	
Soil Survey	Low Risk	

B.2.m. Surface Water Contaminants -Temperature

DEFINITION: Water temperature, impacted by human inputs, does not support intended beneficial uses.

Surface Water Contaminants - Temperature Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Water test	State standards	Water temperatures will be suitable for the intended uses and meet or exceed standards established by federal, state or local regulations. Indicators for stream temperature also include suitable aquatic habitat, and the geomorphic condition of the stream.
Shade/Canopy Cover	60-80% where the site supports trees	

B.2.n. Surface Water Contaminants -Pathogens

DEFINITION: Pathogens such as bacteria, viruses, protozoan, parasites, or fungi associated with animal wastes create human or animal health problems associated with beneficial uses of surface waters.

Surface Water Contaminants - Pathogens Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
		Pathogens reaching a surface water body do not exceed allowable standards established by federal, state and local laws. Use predictive tools and observation to determine if animal wastes are managed so there is no significant delivery of pathogens to surface waterbodies. Meeting quality criteria for nutrients will minimize risks of pathogen contamination when livestock waste is being utilized.

B.2.o. Surface Water Contaminants -Aquatic Habitat Suitability

DEFINITION: The quality of surface waters to support aquatic life is limited by contaminants. Habitat suitability includes riparian habitat, thermal conditions, flow regime, stream morphology, and floodplain function. Invertebrates, amphibians and fish as well as other aquatic and terrestrial species require adequate habitat suitability to survive and prosper.

Surface Water Contaminants - Aquatic Habitat Suitability Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative

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Surface Water Contaminants - Aquatic Habitat Suitability Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Stream Visual Assessment Protocol; National Water and Climate Center Technical Note 99-1	Good (7.5 score or better)	Water bodies provide suitable habitat for plants and animals of concern to grow, reproduce and perpetuate at sustainable levels. Aquatic habitat and water temperature meets or exceed standards established by federal, state and local regulations. Use observation and tools to determine if anthropogenic (human activity) inputs significantly impact the aquatic health and riparian/wetland function of surface water bodies.

B.2.o. Surface Water Contaminants -Petroleum Products

DEFINITION: The quality of surface waters can be severely degraded by contamination with petroleum products.

Surface Water Contaminants - Petroleum Storage and Handling Indicator Tools	RMS Quality Criteria Level-Quantitative	RMS Quality Criteria Level-Qualitative
Visual inspection and soils analysis		Petroleum products are stored and handled following pertinent federal, state and local regulations.