

| TSP Objective | International Objective | Tri-State Objective |
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| 1.1-List NRCS roles and responsibilities in nutrient management planning as described in the following documents: GM 190-402, Nutrient Management Standards 590, Field Office Technical Guide (FOTG) Section IV | | |
| 1.2-List national, state-specific, and local-specific policies that relate to nutrient management planning | | |
| 1.3-Describe your state's nutrient management certification process | | |
| 1.4-Explain why nutrient management is important to the environment and public health | | |
| 1.5-Explain the responsibility of nutrient management planners | | |
| 1.6-Describe the role of nutrient management in: cash crop agricultural systems, crop and livestock agricultural systems, intensive livestock agricultural systems, and specialty crops | <p>NM7.6- Describe when to use N-based or P-based recommendations for manure/bio-solid application</p> <p>NM7.7- Given soil analysis recommendations and manure analysis, use manure and commercial fertilizer sources to construct a P-based and N-based nutrient application program</p> | |
| 1.7-Identify professional risks involved for the planner in nutrient management planning | | |
| 1.8-Describe the roles and responsibilities of private entities and agencies other than the NRCS in nutrient management planning | | |

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| <p>1.9- Use Sections I – V of the eFOTG in nutrient management planning</p> | <p>NM7.6-Describe when to use N-based or P-based recommendations for manure/biosolid application</p> <p>NM7.7-Given soil analysis recommendations and manure analysis, use manure and commercial fertilizer sources to construct a P-based and N-based nutrient application program</p> <p>NM7.8-Describe how the following areas are environmentally sensitive: a) surface waters, b) sinkholes, c) direct conduits to groundwater, d) wetlands</p> | |
| <p>1.10-Incorporate national, state, and local water quality regulations into the nutrient management components of a conservation plan</p> | | |
| <p>2.1-Describe how the following chemical, biological, and physical processes affect nutrient management planning: oxidation, reduction, leaching, immobilization, volatilization, mineralization, denitrification, atmospheric deposition, erosion, runoff</p> | <p>NM7.10-Describe how N and P loss from the following can affect the environment: erosion, a) erosion, b) runoff, c) volatilization, d) leaching, e) denitrification, f) tile drainage</p> | |
| <p>2.2-Explain Liebig’s Law of the Minimum</p> | <p>NM1.1-List the 17 elements essential for plant nutrition</p> | |
| <p>2.3-Outline nutrient cycles for C, N, P, K, and S</p> | <p>NM2.2-Describe nutrient mineralization, immobilization, and uptake antagonism between ions</p> | |
| <p>2.4-Explain how soil test nutrient levels relate to crop yield response and potential environmental impacts</p> | | |

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| 2.5-State the environmental risk of applying nutrients above economic optimums | | |
| 2.6-Describe how nutrient availability, detachment, and transport affect nutrient movement | SW3.1-Describe the processes of detachment, transport, and deposition for wind and water erosion | |
| 2.7-Describe processes that affected the fate of nutrients in the environment | SW3.6-Describe how erosion affects the following: a) crop yield potential, b) water holding capacity, c) nutrient content, d) organic matter content, e) infiltration, f) water quality, g) air quality | |
| 2.8-Describe how erosion, runoff, leaching, and volatilization affect nutrient movement in the environment | SW7.7-List the processes that transport nitrogen or phosphorus from a field SW7.8-List management practices that reduce phosphorus or nitrogen transport from a field SW 7.9-Describe how lateral flow of shallow groundwater contributes to surface water contamination | |
| 2.9-Explain how C, N, P, and S move in the environment | SW7.5-Describe how the following affect N, P, K, or S movement: a) soil pH, b) organic matter, c) CEC, d) soil texture, e) nutrient solubility | |
| 2.10-List negative impacts of C, N, P, K, and S on the environment | | |
| 2.11-List the negative impact of excess salts in soils | SW10.16-Explain how salinity and sodicity affect water quality | |
| 2.12-Describe how to manage excess salts in a soil | SW10.16-Explain how salinity and sodicity affect water quality | |
| 2.13-Describe the role of soil quality in nutrient management planning | | |
| 2.14-Define eutrophication | SW10.4-Define eutrophication and hypoxia | |

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| 2.15-Describe how eutrophication occurs | | |
| 2.16-List consequences of eutrophication | | |
| 2.17-List sources of heavy metals in soils | SW10.13-Describe how the following components of biosolids affect surface water quality | |
| 2.18-Explain why heavy metals are hazardous in the environment | | |
| CLIMATE AND WEATHER | | |
| 3.1-Explain how climate and weather affect nutrient management planning | SW8.2-Describe how the following factors influence evapotranspiration: a) wind, b) temperature, c) solar radiation, d) relative humidity, e) plant available water, f) plant canopy, g) crop residue surface cover SW8.3-Explain how excessive soil moisture affects plant nutrient uptake and availability SW8.4-Explain how soil moisture deficiency affects plant nutrient uptake and availability | |
| 3.2-Explain the importance of the following climate and weather phenomena on nutrient management planning: intensity, type, and duration of precipitation; temperature, humidity, wind, and barometric pressure | | |
| 3.3-Locate climatological data for a given site | | |
| IRRIGATION | | |
| 3.4-List irrigation factors that may increase nutrient leaching, volatilization, runoff, and erosion | SW9.5-Identify methods to reduce irrigation runoff | |
| 3.5-Explain how irrigation affects nutrient management planning | | |
| 3.6-Describe how nutrient contamination of ground and surface water can occur from irrigation | | |

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| 3.7-Construct an irrigation frequency schedule to minimize leaching and surface runoff potential and reduce irrigation-induced erosion | SW9.3-Explain how to use field soil moisture measurements and the water balance equation to schedule irrigation | |
| 3.8-Use a soil survey to determine the available water-holding capacity and intake rate of a soil to be irrigated | | |
| 3.9-Use NRCS irrigation guide or local weather data to determine daily/monthly consumptive use values | | |
| 3.01-Calculate nitrogen credits from irrigation water application | | |
| 3.11-Describe the role of fertigation in nutrient management planning | | |
| DRAINAGE | | |
| 3.12-List drainage factors that may increase nutrient leaching, volatilization, and runoff from the soil | SW9.4-Describe how soil texture affects tile drainage spacing and depth | |
| 3.13-Explain how drainage affects nutrient management planning | | |
| 3.14-Describe how nutrient contamination of surface water can occur from tile drainage | | |
| 3.15-Describe how to use drainage management to reduce nutrient losses to surface water | | |
| PROFICIENCY AREA 4-Environmental Risk Analysis | | |
| 4.1-Explain why environmental risk analysis is an important component of nutrient management planning | | |
| 4.2-Explain why the following may be environmentally sensitive: perennial water bodies, surface inlets, areas of concentrated | SW10.7-Identify health risks to humans when drinking water contains nitrate-N or coliform bacteria above the drinking water standard | |

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| <p>flow; shallow depth to groundwater; coarse textured soils; working or abandoned wells; karst terrain and sink holes; public water supply wellheads, public water supply watersheds, lakes, ponds, and reservoirs, areas prone to flooding, leaching, and runoff; stream corridors</p> | <p>SW10.8-Recognize health risks to livestock of drinking high nitrate-N water</p> <p>SW10.9-Describe how water contamination occurs at a well head</p> <p>SW10.10-Explain methods of preventing contamination at a wellhead</p> <p>SW10.11-Explain the purpose of anti-back-siphoning devices</p> <p>SW10.12-Explain how high sediment levels affect surface water quality</p> | |
| <p>4.3-Describe the importance of social and interpersonal concerns in nutrient management planning</p> | | |
| <p>4.4-Explain environmental risks associated with improper nutrient management</p> | <p>SW10.14-Explain how nitrogen and phosphorus affect ground and surface water quality</p> | |
| <p>4.5-Describe how to use water quality vulnerability assessment tools in conservation planning</p> | | |
| <p>4.6-Define risks involved in nutrient management due to: a) sediments, b) pathogens, c) N, d) P, e) K, f) S</p> | <p>SW10.7-Identify health risks to humans when drinking water contains nitrate-N or coliform bacteria above the drinking water standard</p> <p>SW10.12-Explain how high sediment levels affect surface water quality</p> | |
| <p>4.7-Describe how to use soil test results in environmental risk analysis</p> | | |
| <p>4.8-Describe the risks to livestock from forages grown on high soil test K soils</p> | | |

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| 4.9-Describe the importance of the Ca/Mg ratio when feeding forages to livestock | | |
| 4.10-Use individual site characteristics for the Phosphorus Index to characterize the vulnerability of a site for P loss | 7.4-Describe factors involved in phosphorus loss assessment at field scale | |
| 4.11-Describe methods of reducing site vulnerability to soluble and sediment-bound phosphorus transport | SW10.15-Explain the benefits of drainage control structures, bioreactors, filter/buffer strips, riparian zones/tree plantings, and wetlands on water quality | |
| 4.12-Use individual site characteristics for the Leaching Index to characterize the vulnerability of a site for nitrate leaching | | |
| 4.13-Describe methods of reducing site vulnerability to nitrogen leaching | SW10.15-Explain the benefits of drainage control structures, bioreactors, filter/buffer strips, riparian zones/tree plantings, and wetlands on water quality | |
| 4.14-Use the Revised Universal Soil Loss Equation (RUSLE) and Wind Erosion Equation (WEQ) to evaluate the risk of soil transport by erosion from a site | | |
| 4.15-Describe methods of reducing site vulnerability to soil erosion | SW3.7-Explain how the following decrease erosion potential: a) strip cropping, b)contouring, c) terraces, d) grassed waterways, e) surface residue, f) cover crops, g) row spacing and direction, h) buffer strips, i) surface roughness, j) windbreaks, k) grade stabilization structure | |
| 4.16-Describe how the following soil properties impact nutrient movement to surface or groundwater: texture, organic matter, structure, degree of erosion, slope steepness, slope length, soil test levels for N, P, K, and pH, vegetation, land use | SW3.3-Explain how the following affect the rate of erosion by water: a) duration and intensity of rainfall, b) soil texture and structure, c) slope length, d) slope steepness, e) vegetative and residue cover | |

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| | SW3.4- Explain how the following affect the rate of erosion by wind: a) vegetative and residue cover, b) wind velocity, direction, and duration c) unsheltered distance, d) soil surface roughness, e) soil texture | |
| 4.17-Define TMDL | | |
| 4.18-Locate a TMDL list for a watershed in a state | | |
| 4.19-Describe how TMDLs impact a nutrient management plan in a watershed | | |
| PROFICIENCY AREA 5-Nutrient Application Management | | |
| 5.1-Describe how and when to use the following methods of monitoring nutrients in agricultural systems: whole-field sampling; grid sampling; management unit sampling; tissue analysis; remote sensing; Pre-Sidedress Nitrogen Test; Chlorophyll meters. | NM3.3-Differentiate grid, zone, and whole field sampling approaches CM5.4-Differentiate management zone, grid, and field composite approaches to precision farming | |
| 5.2-Describe how the following nutrient sources affect nutrient application; commercial fertilizer, animal manures, industrial and municipal biosolids, compost, sludge, irrigation water | NM4.1-Describe how the following serve as plant nutrient sources: a) organic matter, b) irrigation water, c) inorganic/organic fertilizers, d) soil minerals, e) animal manure/processed waste water, f) urban/industrial byproducts/biosolids, g) crop residue, h) residual soil nutrients, i) shallow ground water | |
| 5.3-Describe how the following affect nutrient application; timing, application rate, method of application, placement, form | NM7.3-Use crop nutrient removal, cropping system, and soil analysis information to apply the 4R nutrient management principles of the right source, rate, time, and place | |
| 5.4-Utilize soil test results and state fertilizer recommendations in developing a nutrient management plan | NM3.7-Recognize how the following affect soil analysis interpretation for crop management: a) probability of crop response to added nutrients, b) reported nutrient | |

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| | sufficiency level, c) units used to report results, d) within-field variability, e) environmental risk | |
| 5.5-List factors to consider when making a fertilizer recommendation | 7.2-Describe how to set a realistic yield goal by using information about: a) production history, b) soil productivity, c) management level, d) yield-limiting factors | |
| 5.6-Describe how to use the following precision agriculture techniques in nutrient management; remote sensing, yield monitoring, GIS/GPS, site-specific soil testing | CM2.2-Define global positioning systems CM2.3-Describe how the following precision agriculture tools are used in crop management: a) guidance systems, b) remote sensing, c) geographi8c information systems (GIS), d) crop management zone, e) variable rate technology (VRT) | |
| 5.7-Describe how to use soil test results in a nutrient management plan | CM7.7-Given soil analysis recommendations and manure analysis, use manure and other fertilizer sources to construct a P-based or N-based nutrient application program | |
| PROFICIENCY AREA 6: Components of Nutrient Management Plan | | |
| 6.1-Use the following components to construct an economically and environmentally sound nutrient management plan: a)maps of facilities, fields, landscapes, and soils, b)environmentally sensitive areas, c)cropping system rotation, d)expected yields, e)results of soil, plant, water, and manure analysis, f)quantification of nutrients from all sources available to the farm, g)nutrient budget for each field, h)recommendations of nutrient rate, timing, form, and method of application, i)review and modification of plan | 7.9-Describe the importance of the following components of an economically and environmentally sound nutrient management plan: a)maps of facilities, fields, and soils, b) environmentally sensitive areas, c) cropping system, d) expected yields, e) results of soil, plant, water, and manure analyses, f) quantification of nutrients from all sources available to the farm, g) nutrient budget for each field, H0 recommendations of nutrient rate, timing, form, and method of application, i) review and modification of plan as needed, j) records of management practices | |

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| as needed, j)operation and maintenance of the plan | | |
| PROFICIENCY AREA 7: Implementing the Nutrient Management Plan | | |
| 7.1-Identify parties responsible for implementing a nutrient management plan | | |
| 7.2-Describe procedures to identify and track changes in soil test nutrient levels over time | | |
| 7.3-Explain consequences of increasing soil nutrient levels after implementing a nutrient management plan | | |
| 7.4-Identify changes in a farm operation that require updates/adjustments to a nutrient management plan | | |
| 7.5-Identify implementation, follow-up, and recordkeeping components of a nutrient management plan as identified in the 590 Standard | | |
| 7.6-Complete a "Nutrient Management Job Sheet" | | |
| | NM4.10-Describe how the following affect nutrient availability from manure: a) physical form, b) animal source/ration, c) Moisture content/percent solids, d) stage of decomposition/composting, e) storage and handling, f) application and timing method | |
| | NM4.11-Describe the importance of collecting a representative sample of manure or effluent | |
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