BENEFITS OF IRRIGATION MANAGEMENT AND CONSERVATION

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ALL ABOUT IRRIGATION

7 MARCH 2018

WATER CONSERVATION?

- WHAT IS A DEFINITION?
 - USING LESS WATER?
 - SAVING THE WATER WE HAVE?
 - STORING WATER FOR LATER USE?
 - INCREASING WATER HOLDING CAPACITY OF SOIL?
 - INCREASING INFILTRATION?
 - REDUCING WASTING?

WATER CONSERVATION

BEING KNOWLEDGEABLE OF THE AVAILABLE WATER THAT WE HAVE TODAY AND TAKING ACTION TO PROTECT ALL SOURCES OF WATER IN ORDER THAT THERE IS PLENTY FOR USE BY EVERYONE, EVERYTHING AND AVAILABLE WHEN NEEDED THE MOST.

HYDROLOGY PRINCIPLES

HYDROLOGY – THE GENERAL SCIENCE/STUDY OF WATER

"THE SCIENCE THAT TREATS WATERS OF THE EARTH, THEIR OCCURRENCE, CIRCULATION, AND DISTRIBUTION, THEIR CHEMICAL AND PHYSICAL PROPERTIES, AND THEIR REACTION WITH THEIR ENVIRONMENT, INCLUDING THEIR RELATION TO LIVING THINGS" (PRESIDENTIAL SCIENCE AND POLICY COUNCIL, 1959).

"THE SCIENCE THAT DEALS WITH THE PROCESSES GOVERNING THE DEPLETION AND REPLENISHMENT OF THE WATER RESOURCES OF THE LAND AREAS OF THE EARTH" (WISLER AND BRATER, <u>HYDROLOGY</u>, 1959, JOHN WILEY AND SONS)

HYDROLOGIC CYCLE:







Irrigation Losses



INCREASING INFILTRATION?



And - Thereby Reduce Runoff

VIRGINIA NRCS MOST POPULAR PRACTICES (TOP 15, COUNT BASED) IN EQIP

- Fence
- Access Control
- Watering Facility
- Nutrient Management
- Livestock Pipeline
- Heavy Use Area Protection
- Prescribed Grazing
- Forage and Biomass Planting
- Cover Crop
- Conservation Crop Rotation
- Herbaceous Weed Control
- Brush Management
- Pumping Plant
- Critical Area Planting
- Conservation Cover

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 - **Irrigation Water Management**

EFOTG – ELECTRONIC FIELD OPERATION TECHNICAL GUIDE





NUTRIENT MANAGEMENT

NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD

NUTRIENT MANAGEMENT

(Ac.)

CODE 590

DEFINITION

Managing the amount (rate), source, placement (method of application), and timing of plant nutrients and soil amendments.

PURPOSE

- To budget, supply, and conserve nutrients for plant production.
- To minimize agricultural nonpoint source pollution of surface and groundwater resources.
- To properly utilize manure or organic byproducts as a plant nutrient source.
- To protect air quality by reducing odors, nitrogen emissions (ammonia, oxides of nitrogen), and the formation of atmospheric particulates.
- To maintain or improve the physical,

regulation at 4 VAC 50-85. Some provisions in these regulations are mandatory requirements (containing the verb "shall"). The general criteria in this Standard include requirements identical to all of the mandatory requirements found in state regulation starting at 4 VAC 50-85-130. Therefore, any NMP satisfying the general criteria of this Standard will also satisfy the minimum requirements of Virginia's state rules governing the writing of NMPs.

The following technical documents referenced in the state NMP regulations are also referenced in this Standard:

- Virginia Nutrient Management Standards & Criteria, revised zJuly 2014 ("DCR Standards & Criteria").
- Virginia Phosphorus Index Version 2.0 Technical Guide, revised October 2005 ("VA P Index").

COVER CROPS

NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD

COVER CROP

(Ac.)

CODE 340

DEFINITION

Grasses, legumes, and forbs planted for seasonal vegetative cover.

PURPOSE

This practice is applied to support one or more of the following purposes:

- Reduce erosion from wind and water.
- Maintain or increase soil health and organic matter content.
- Reduce water quality degradation due to excessive soil nutrients.
- Suppress excessive weed pressures and break pest cycles.
- Improve soil moisture management.
- Minimize soil compaction.

CONDITIONS WHERE PRACTICE APPLIES

All lands requiring seasonal vegetative cover for natural resource protection or improvement.

Ensure that species selection and associated management specifications (seeding rates and dates, fertility requirements, etc.) are consistent with the Plant Establishment Guide for Virginia, Virginia technical notes, or other approved guidance.

Ensure that plants designated as noxious weeds in Virginia shall not be used as cover crops.

Ensure that cover crop residue is not burned.

For non-irrigated cover crops, timing of cover crop termination must be consistent with the attached NRCS Cover Crop Termination Guidelines – Non-Irrigated Cropland. The core requirement applicable to Virginia is that non-irrigated cover crops must be terminated no later than five days after planting of the subsequent crop, but before emergence of the subsequent crop.

Ensure herbicides are compatible with cover crop selections and purpose(s).

When a cover crop will be grazed or hayed,

COVER CROPS AND CONSERVATION TILLAGE



Irrigation Losses





G.L. Hawkins, J. Kelton, N. Smith, and K. Balkcom (2016) A Note on Comparing Rate of Soil Moisture Loss for Conventional and Conservation Tillage Production methods for Peanut (Arachis hypogaea). Peanut Science: July 2016, Vol. 43, No. 2, pp. 168-172.

BENEFITS OF CONSERVATION TILLAGE AND COVER CROPS ON HYDROLOGIC PROCESS

- SOIL ORGANIC MATTER PRODUCED FROM RESIDUE RETAINS WATER
- PROVIDES A HIGHER POROSITY TO STORE MORE WATER
 - OPENS CHANNELS DEEPER INTO SUBSURFACE
- STORES WATER IN OPEN CHANNELS PRODUCED FROM DECAYED
 ROOTS
 35%
 - REDUCES THE AMOUNT OF WATER REQUIRED FROM IRRIGATION

Organic Matter : Topsoil

Subsoil

15% surface water runoff

Groundwater

Bedrock

CONSERVATION COVER

CONSERVATION COVER

(Ac.)

CODE 327

DEFINITION

Establishing and maintaining permanent vegetative cover.

PURPOSE

This practice may be applied to accomplish one or more of the following:

- Reduce sheet, rill, and wind erosion and sedimentation.
- Reduce ground and surface water quality degradation by nutrients and surface water quality degradation by sediment.
- Reduce emissions of particulate matter (PM), PM precursors, and greenhouse gases.
- Enhance wildlife, pollinator and beneficial organism habitat.
- Improve soil health.

CONDITION WHERE PRACTICE APPLIES

This practice applies on all lands needing permanent vegetative cover. This practice does not apply to plantings for forage Plant species suitable for the planned purpose and site conditions. Avoid using invasive species. Avoid persistent, matte forming species such as Bermuda grass and fescue.

Follow recommendations for planting rates, methods and dates obtained from the Virginia Plant Establishment Guide or other approved source.

Ensure seeding rates and methods are adequate to accomplish the planned purpose. Use certified seed.

Select appropriate planting dates, planting methods and take care in handling and planting of the seed or planting stock to ensure that planted materials have an acceptable rate of survival. Use a reliable supplier when acquiring vegetative planting material (e.g. sprigs, rhizomes, bulbs).

Use sufficient site preparation to eliminate weeds for establishment and growth of selected species.

Use appropriate timing and planting equipment for the site and soil conditions.

Apply nutrients following the nutrient

NATURAL RESOURCES CONSERVATION SERVICE VIRGINIA CONSERVATION PRACTICE STANDARD

IRRIGATION WATER MANAGEMENT

(Ac.)

CODE 449

DEFINITION

The process of determining and controlling the volume, frequency, and application rate of irrigation water.

PURPOSE

- Improve irrigation water use efficiency
- Minimize irrigation induced soil erosion
- Decrease degradation of surface and groundwater resources
- Manage salts in the crop root zone
- · Manage air, soil, or plant micro-climate
- Reduce energy use

CONDITIONS WHERE PRACTICE APPLIES

This practice is applicable to all irrigated lands.

An irrigation system adapted for site conditions (soil, slope, crop grown, climate, water quantity When irrigation water is limited, develop an IWM Plan that will meet critical crop growth stages.

Include in the IWM plan the method for determining the flow rate or total volume of irrigation water required for each irrigation event.

Include in the IWM plan the method for determining the timing and amount of each irrigation event using at least one of the following methods:

- Evapo-transpiration of the crop, using appropriate crop coefficients and reference evapo-transpiration data,
- · Soil moisture monitoring, and/or
- Scientific plant monitoring (e.g. leaf water potential or leaf/canopy temperature measurements).

When irrigation water is not available on demand, such as when provided by an

Thanks and

Questions?

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