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| Course Name: Watering Systems for Livestock - Module | |
| Course Coordinator: Environmental Engineer/State Grazing Specialist | Course Number: MI0077 |

Overview: This course will cover the importance of adequate water to livestock and especially in a Prescribe Grazing System. This course will cover design, layout and application documentation of watering systems for grazing livestock. The module will review in detail the standards: Watering Facilities (614), Pipeline (516), and Spring Development (574).

Purpose: The purpose of this course is to prepare the participant to be able to apply with supervision and assistance from NRCS engineering staff the 614, 516, and 574 NRCS standards. Participants will learn to properly document their planning and application as part of a conservation plan for customers who choose these alternatives in planning and applying a watering system for livestock.

Prerequisites: Each participant must have at least 3 years experience as a resource conservationist and have completed the following modules -

- Prescribed Grazing
- Fence

Duration: 6 hours of classroom instruction as well as one 6-hour day of a field workshop. Classroom sessions and field workshop sessions need not be 2 consecutive days. At least 15 hours of planning an actual watering system and installation for a livestock farm with supervision from an engineer and/or grazing specialist OJT is needed.

Target Audience: NRCS and conservation partnership employees providing conservation planning and livestock watering systems planning and application assistance to customers.

Expected Outcomes: The participant at the end of the course and reviewing their first watering system plan with the appropriate experienced NRCS employee will be at the proficiency level 3 - Can Apply with Supervision - can perform planning and applying a livestock watering system with supervision. Actual planning and applying 2 livestock watering systems with supervision would then allow the NRCS employee to apply these practices independently - proficiency level 4 - Apply Independently, as approved by the appropriate NRCS approving authority staff unless special problems are encountered.

Resources needed: Classroom with table and chairs for a maximum of 20 participants. Overhead projector, flip chart or dry erase board with appropriate markers, laptop computer with CD drive and computer projector. Farm/ranch site where a sound watering system for livestock was planned by NRCS and the farm/ranch is ready for installation.

Outline for: **Watering Systems for Livestock - Module**

WHY worry about where livestock drink?

HOW do we provide water to them?

1. Amount needed
2. Sources of Water
3. Power sources (delivery systems)
4. Access (tanks, crossings, livestock access standard)

STANDARDS REVIEW

1. Pipeline
2. Watering Facilities
3. Spring Development

DESIGN BY WATER SOURCE

1. Springs
2. Wells
3. Creeks
4. Ponds

SURVEY OF ROUTE

Profile Development

PIPELINE SYSTEM AND HYDRAULICS

1. Gravity System
2. Pumped System

APPURTANANCES - ELECTRICAL VS. MANUAL

1. Valves - 1 way, 2 way, 3 way
2. Gate Valves
3. Flow Controls
4. Hydrants with Floats

PUTTING IT ALL TOGETHER TO COMPLETE THE SYSTEM

1. Examples
2. Calculations helps
 - A. Worksheets
 - B. Excel Spreadsheets