U.S. Department of Agriculture
Natural Resources Conservation Service

Irrigation Water Management Plan—Sprinkler Irrigation System

NAME _____ DATE _____ PREPARED BY _____

DISTRICT _____ COUNTY _____ ENGR JOB CLASS _____

Crop information

Field number(s)					
Crop irrigated					
Acres Irrigated (acres)					
Normal rooting depth (feet, inches)					
Management allowable depletion (MAD) (percent, inches)					
Peak daily crop requirements (ac-in/day)					
Average annual net irrigation requirements (ac-in/ year)					

Soil Information

Soils series and surface texture			
Capability class			
Allowable soil loss (T=tons per-acre per year)			
Wind Erodibility Group (WEG)			
Actual on-site (observed and measured) average root zone depth			
Total available water capacity (AWC) of soil plant root zone			
Soil intake (Maximum application rate for sprinkler system)			
Available water capacity (AWC) for crop rooting depth:	Depth (inches)	AWC (inch/inch)	AWC (total inches)

Irrigation system management information

Irrigation system
Source of water
Delivery schedule
Estimated overall irrigation efficiency
Management allowable depletion for pasture
Irrigation set time to apply full irrigation and replace full MAD
Gross application
Net application
Actual gross sprinkler application rate
Irrigation system flow capacity requirement for full time irrigation, Q (gpm)

Irrigation Water Management Plan— Sprinkler Irrigation System—*Continued*

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Irrigation scheduling Information

Month	Monthly net[1] irrigation requirement (inches)	Crop evapo-transpiration use rate (in/day)	Irrigation frequency needed (days)	Average[2] number of Irrigations needed
April				
May				
June				
July				
August				
September				
October				
Total	0	0	0	0

[1] Net irrigation requirement (NIR) represents crop evapotranspiration less effective rainfall.

[2] Assuming a full soil profile at start of season. Check soil moisture before irrigating. Account for rainfall that can replace soil moisture depletion. If soil moisture depletion is less than 50% wait for a few days and check it again.

Warmer than “average” months will typically require additional irrigation water; cooler than “average months will typically require less irrigation water; months with more than “average” effective rainfall will typically require less irrigation water.

Only operate the system when needed to furnish water for crop needs. The preceding irrigation schedule can be used as a guide to determine when to irrigate. It is a guide only for average month and year conditions. Optimizing use of rainfall to reduce unnecessary irrigations during the growing season is a good management practice. In semi-humid and humid areas, it is recommended to not replace 100 percent of the soil moisture depletion each irrigation. Leave room in the plant root zone for containing water infiltration from rainfall events. This will vary with location, frequency, and amount of rainfall occurring during the growing season. It should be approximately 0.5 to 1.0 inches.

Maintaining to a higher soil moisture level (MAD) typically does not require more irrigation water for the season, just more frequent smaller irrigations. This is especially true with crops such as root vegetables, potatoes, onions, garlic, mint, and sweet corn.

The attached chart for evaluating soil moisture by the feel and appearance method can be used to help determine when to irrigate. Other common methods to monitor crop water use and soil moisture include: plant signs (crop critical moisture stress periods), atmometer, evaporation pan (applying appropriate factors), tensiometers, electrical resistance blocks (moisture blocks), and crop water stress index (CWSI gm).

NRCS (SCS) - SCHEDULER computer software is available to provide calculations of daily crop evapotranspiration when used with local daily weather station values. On-site rainfall data is necessary to determine effective rainfall, whereas local weather station rainfall data is not sufficiently accurate due to spatial variability. Current rainfall and soil moisture data can be input manually or electronically to assist in predicting when irrigation is needed.

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A properly operated, maintained, and managed sprinkle irrigation system is an asset to your farm. Your system was designed and installed to apply irrigation water to meet the needs of the crop without causing erosion, runoff, and losses to deep percolation. The estimated life span of your system is 15 years. The life of the system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

Pollution hazards to ground and surface water can be minimized when good irrigation water management practices are followed. Losses of irrigation water to deep percolation and runoff should be minimized. Deep percolation and runoff from irrigation can carry nutrients and pesticides into ground and surface water. Avoiding spills from agricultural chemicals, fuels, and lubricants. will also minimize potential pollution hazards to ground and surface water.

Leaching for salinity control may be required if electrical conductivity of the irrigation water or soil water exceeds plant tolerance for your yield and quality objectives. If this condition exists on your field(s), a salinity management plan should be developed.

The following are system design information and recommendations to help you develop an operation and maintenance plan (see irrigation system map for layout):

- average operating pressure =_____ lb/in^2 (use a pressure gage to check operating pressure)
- nozzle size = _____ inch (use shank end of high speed drill bit to check nozzle wear)
- average sprinkler head discharge _____ gpm
- sprinkler head rotation speed should be 1 - 2 revolutions per minute
- sprinkler head spacing on lateral = _____ ft; outlet valve spacing on main line _____ft
- lateral, number(s) _____, _____ ft, _____ inch diameter _____
- main line = _____ ft _____ inch diameter, type _____, class_____
- pump = _____, _____ gpm @ _____ ft Total Dynamic Head (TDH)

Make sure that all measuring devices, valves, sprinkler heads, surface pipeline, and other mechanical parts of the system are checked periodically and worn or damaged parts are replaced as needed. Always replace a worn or improperly functioning nozzle with design size and type. Sprinkler heads operate efficiently and provide uniform application when they are plumb, in good operating condition, and operate at planned pressure. Maintain all pumps, piping, valves, electrical and mechanical equipment in accordance with manufacturer recommendations. Check and clean screens and filters as necessary to prevent unnecessary hydraulic friction loss and to maintain water flow necessary for efficient pump operation.

Protect pumping plant and all associated electrical and mechanical controls from damage by livestock, rodents, insects, heat, water, lightning, sudden power failure, and sudden water source loss. Provide and maintain good surface drainage to prevent water pounding around pump and electrical equipment. Assure all electrical/gas fittings are secure and safe. Always replace worn or excessively weathered electric cables and wires and gas tubing and fittings when first noticed. Check periodically for undesirable stray currents and leaks. Display appropriate bilingual operating instructions and warning signs as necessary. During non-seasonal use, drain pipelines and valves, secure and protect all movable equipment (i.e. wheel lines).

If you need help developing your operation and maintenance plan, contact your local USDA Natural Resources Conservation Service office for assistance.