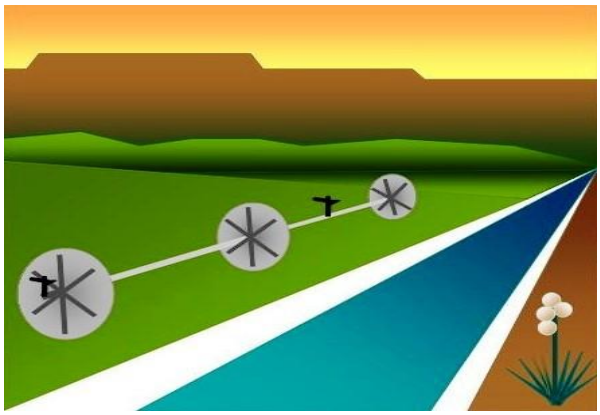
Hammond Conservancy District



January 2009 Newsletter

January 15, 2009

Well, here it is a new year already and while we're all trying to stay warm during these cold and snowy January days, it's not too early to start thinking about the upcoming irrigation season - which officially begins in about 90 days. We've received some pretty good moisture so far this winter (about 2.2 inches from Thanksgiving to January 7), much of it in the form of snow, but there' no telling how much more we'll get before April 15 when water is turned back out into the HCD canal. Snowpack in the San Juan Mountains is greater than 100% of average for this time of year (mid-January) as some peaks have received over 100 inches already. Navajo Reservoir is about 75% full (as of January 7) and water is being released at a rate of 500 cubic feet per second (cfs). While we can probably all breathe a sigh of relief in not having to worry about water shortages in 2009, we should still strive to use our water wisely.

Two specific items that can, and should, be attended to soon include **irrigation system maintenance** and **weed control in alfalfa**. This newsletter will address these issues.

Wheel-move (side roll) Sprinkler Systems

With proper operation and maintenance, a well-designed wheelmove or sideroll sprinkler system is a dependable and fairly efficient method for irrigating rectangular fields of short crops such as alfalfa, oats or other small grains, pasture grass, etc. It is the most common system used to irrigate alfalfa, pastures, and other short crops on the

Hammond Conservancy District (HCD). The system consists of a power mover (a small gasoline engine and gear mechanism), a 4 to 5 inch diameter, jointed lateral pipe (which carries the water and serves as a wheel axle), the wheels (which may vary in diameter from 5 to ten feet), the sprinklers (usually the brass impact type with 1 or 2 nozzles), sprinkler levelers (a swiveling connector pipe between the lateral pipe and sprinkler), drains with seals (that automatically close under pressure and open to drain water from the pipe before moving the unit), couplers (which join the 30 to 40 foot-long pipe joints and other components together), and rubber gaskets (which are installed at one end of each pipe joint to prevent leakage at the connection point). Water is provided to the sideroll through a flexible hose that connects to valve opener on a mainline riser or to the outlet on a water pump.

The sideroll system has obvious advantages over flood, furrow, or corrugation irrigation in that water can be applied more uniformly to sloped or undulating fields. With careful management, loss of water below the crop root zone through deep percolation and runoff of water from the field is less than with flood or furrow. Less labor is usually involved with the sideroll system as compared to furrow irrigation and solid set or hand-move sprinkler irrigation since there are no ditches to maintain and pipe does not need to be hand carried. Once the system has been moved (which usually takes less than 15 or 20 minutes) it will usually take care of itself if provided with pressurized water.

There are some distinct disadvantages to the sideroll system. They are certainly more expensive than flood or furrow systems, both to purchase and maintain, although this expense may be somewhat offset by the value of reduced labor and convenience. The sprinklers require pressurized water (30-60 psi) to operate properly and unless the sideroll inlet has more than 60 feet of head (height of water level above inlet), a pump will usually be required for effective water application. As energy costs increase, the expense of operating the pump may become prohibitive if the economic return from crop production does not exceed this operating cost. The water application efficiency of sprinkler irrigation, unlike flood or drip, can be negatively affected by the wind, which can be acutely evident during daylight hours in the spring. This can create excessively wet and dry spots in the field which may adversely affect crop growth and yield. All other factors being equal, the dependability and water application efficiency of the sideroll system are directly related to the operation and maintenance of the unit.

The Utah State University Extension Service has prepared several excellent articles that pertain to the operation and maintenance of sideroll sprinkler systems. These articles, and their website links are:

1. Maintenance of Wheelmove Irrigation Systems

http://extension.usu.edu/files/publications/publication/ENGR_BIE_WM_05.pdf

2. Wheelmove Sprinkler Irrigation Operation and Management
http://extension.usu.edu/files/publications/publication/ENGR_BIE_WM_08.pdf

3. Sprinklers, Crop Water Use and Irrigation Time – San Juan County
http://extension.usu.edu/files/publications/publication/ENGR_BIE_WM_34.pdf

Highlights of publication number 1.
Maintenance of Wheelmove Irrigation Systems
http://extension.usu.edu/files/publications/publication/ENGR_BIE_WM_05.pdf

Some of the maintenance tasks that can, and should, be performed on the sideroll power mover mechanism and piping system well ahead of the first spring irrigation include:

- Inspect, clean and lubricate all drive chains and gears. Replace and or realign if necessary.
- Drain and replace the engine oil in the drive motor.
- Clean or replace the air filter.
- Clean exterior surfaces of the engine, particularly the cooling fins.
- Check the transmission fluid reservoir and add hydraulic oil if needed or replace fluid if dirty. Also service the transmission filter if equipped.
- Drain old gasoline if not done in fall and replace with fresh. If old gasoline was left in the tank and lines during the winter, it may have thickened and blocked the fuel passages. In this case it may be necessary to clean the carburetor and fuel lines before the engine will start.
- Inspect entire irrigation system for loose bolts, damage, excessive wear, etc. and repair or replace parts as necessary.
- Start the engine and check the drive mechanism.
    - Note: Before attempting to start the engine, remove the spark plug, clean and re-gap or replace if necessary. While plug is removed, add a small quantity (tablespoon) of clean oil to the cylinder and, while keeping the spark plug wire away from the hole, turn the crankshaft of the engine to lubricate the piston rings and cylinder wall. Replace the spark plug, reconnect wire, prime the carburetor or choke, and then start.

Periodic maintenance of the motor and drive mechanism throughout the irrigation season will help prevent breakdowns which can induce crop water stress that may hurt crop yields. These in-season, preventive maintenance measures, plus procedures for preparing the sideroll for winter, are discussed in more detail in publication 1.

Highlights of publication number 2.
Wheelmove Sprinkler Irrigation Operation and Management
http://extension.usu.edu/files/publications/publication/ENGR_BIE_WM_08.pdf

The water application efficiency of the system can be checked after April 15, when irrigation water becomes available. You should start the season by flushing out your mainline and sideroll feed pipes prior to hooking up the sideroll. Then pull off the sideroll end cap and flush out the entire sideroll pipe prior to filling and pressuring up the line. This will prevent much of the sprinkler clogging caused by sediments or other foreign objects that may have accumulated in the piping during the winter. Once the system is pressured up:

- Inspect all piping, including joints, seats, and gaskets, for leaks. Repair and/or replace as necessary.
- Inspect all sprinklers for plugged nozzles and for proper operation. Are the sprinklers revolving freely and completely (i.e. 360 degrees)? Are the part-circle sprinklers, such as those on the ends, operating properly and providing the desired coverage (i.e. windshield wiping smoothly without stopping or sticking). Unplug nozzles and replace non-working sprinklers.
- Check for mismatched sprinklers and/or sprinkler nozzles. Normally, on a properly designed sideroll sprinkler system, all sprinklers will be the same type and model and all nozzles will be the same size.
- Check for nozzle wear. This can be done with a set of straight-shaft machinist drill bits graduated in 1/64th inch increments (i.e. 1/64, 1/32, 3/64, 1/16, 5/64, etc.). A nozzle is worn if a drill bit larger than the nominal size of the nozzle can fit into the nozzle's orifice. For example, a common nozzle diameter used on HCD sideroll impact sprinklers is 3/16 (= 12/64) inch. The nozzle is excessively worn if a 13/64 drill bit (or larger) can be inserted into the nozzle.

Besides representing a waste of water, it is very important to recognize that leaks and worn nozzles in the sprinkler system can lead to a false indication of water flow. For example, consider a non-leaking sideroll sprinkler that has 30 single-nozzle sprinklers on it that were originally equipped with 3/16 inch nozzles. Suppose these nozzles have been

worn out to a 13/64 inch diameter. The original (or designed) flow rate of the system (at 50 psi) would be about 217 gpm (7.23 gpm per nozzle). With the worn nozzles, the system flow rate (at an equal pressure) has been increased to about 254 gpm (8.48 gpm per nozzle) or 17% higher than when the nozzles were new. Now, because of this higher flow rate (and/or new leaks in the pipe), an irrigator may find that he must order more water than he has in the past to satisfy the higher flow rate of the system. By simply changing the worn nozzles with new ones of the original diameter, and by fixing leaks, the irrigator may find the original water order to now be sufficient to run the system.

Nozzle and gasket replacement are probably the cheapest, yet most effective measures that can be taken to improve water application efficiencies of sideroll sprinkler systems.

Highlights of publication number 3.
Sprinklers, Crop Water Use and Irrigation Time – San Juan County
http://extension.usu.edu/files/publications/publication/ENGR_BIE_WM_34.pdf

After the sideroll has been prepared for the irrigation season, and the application efficiency of the system has been optimized, crop water-use efficiencies (crop yield per unit of water applied or used) can be improved by applying water evenly at a rate equal to the crop's water requirements. This irrigation scheduling technique provides sufficient water to the crop for optimum growth but minimizes the volume of water lost to deep soil percolation and runoff. To effectively schedule irrigations, the sideroll operator must know how much water the system applies, how much water the soil will hold, and how much water the crop needs for optimum growth.

Publication number 3 discusses irrigation scheduling and has some guidelines and interesting tables that recommend sideroll runtimes based on pressure and nozzle sizes. While the alfalfa and pasture water use data are specific to San Juan County, Utah, there should not be a significant difference between them and those recommended for the HCD under similar production potentials. For more specific details on scheduling irrigations here on the HCD, including procedures for performing system audits, please click on the 'Water Management' link from the HCD home page.

Weed Control in Established Alfalfa

Successful weed control in established alfalfa and alfalfa/grass pastures requires early action. According to the weed control specialist at New Mexico State University's Agricultural Science Center at Farmington, Velpar is the herbicide of choice (because it is less expensive than some other herbicides, for one) for controlling weeds in alfalfa but it must be applied before the alfalfa breaks dormancy in the spring (around March 1). **Otherwise, it can damage the alfalfa.** While it is desirable to apply the Velpar in the late fall before the ground freezes and the first snow occurs, it can be applied in February as soon as the ground begins to thaw. Do not apply it when the ground is frozen because the product will not penetrate into the soil and may run off the field. Velpar is both a pre-emergent and post emergent herbicide in that it will prevent the germination of some weed seeds and will kill many emerged weeds and annual grasses (mustards, filaree, cheatgrass, etc.). The rate to apply is 1 quart per acre. The addition of 1 pint of crop oil per acre will increase effectiveness.

After the alfalfa breaks dormancy (and it is no longer safe to apply Velpar), Raptor can be sprayed at a rate of 4 to 6 ounces per acre. To be effective however, it must be applied with a crop oil concentrate (COC) at 2 pints per acre and either 1 quart of UAN (32-0-0) liquid N fertilizer per acre or an N solution made up of 15 to 17 lbs of ammonium sulfate (20-0-0) per 100 gallons of water. To be effective, this Raptor, COC, N solution should be sprayed in April, after the temperatures have warmed up but before the alfalfa begins sheltering the weeds. Spray when the soil surface is dry and then apply 1-2 inches of irrigation after spraying to help move the herbicide into the top few inches of soil. Do not apply excessive irrigation after that until it's evident the weeds are being killed.

Whatever herbicide is used please **'READ AND FOLLOW LABEL DIRECTIONS'.**

Other control methods and herbicides for weed control in established alfalfa can be found at the following web links: http://www.sanjuanweeds.com/FactSheets/weedsinalfalfaFS.pdf

http://alfalfa.okstate.edu/weeds/alfalfa_weed_control_suggestions.htm

Organic methods can be found at:

http://alfalfa.okstate.edu/weeds/alfalfa_weed_control_suggestions.htm

Questions? Comments? Suggestions?
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