

**Jackson Soil & Water
Conservation District's**



Natural Resource Stewardship Handbook



**Prepared and distributed by Jackson Soil & Water Conservation District in
collaboration with our partners**

89 Alder Street, Central Point, OR 97502

Irrigation: Understanding Your Resource

What is Irrigation?

Irrigation is the intentional application of water for the purpose of sustained plant growth and/or optimized production. This includes agriculture, landscape and garden uses.

Irrigation in Jackson County

Only about 6% of the land in Jackson County is irrigable (107,000 Acres). However, this relatively small value contributed to \$53 Million in total crop sales according to the 2017 Ag Census.

Over 2/3rds of the irrigated land is used to produce forage (hay and pasture), while the remainder is split between pears, alfalfa, grapes and recently hemp.

Irrigation type is split between pressurized and flood irrigation. In 2015, 58% of land was irrigated using pressurized sprinklers, 2% with drip irrigation, 40% with flood irrigation.

95% of irrigation water is supplied from surface water sources such as streams, rivers, springs and much of it is captured and redistributed by large reservoirs or small ponds.

Jackson County holds the first official irrigation water right in the state of Oregon. The Beeson – Robison Ditch was established in 1854. Prior to this, Native Americans in the region relied on natural rainfall to grow the vegetation they harvested throughout the year.

Irrigation water is a limited and shared resource and should only be used efficiently and for beneficial uses. Other shared uses of irrigation water in Jackson County include drinking water, recreation, and most notably in-stream aquatic habitat.

water actually used in the season. If irrigation water is pumped, then the cost per acre per year will vary based on actual water used. A more efficient use of water on a crop that needs less water, will result in less pumping costs.



A water right is necessary to allow the use of irrigation water to be applied to a particular area from a particular source. To keep your water right valid, you must irrigate all of the water righted acres at least once every five years. There is no penalty for using less water or using water more efficiently.

In Jackson County, the cost of using irrigation water can be about \$50 to \$100 per acre, per year based on your water provider or irrigation district. This is typically a flat annual fee regardless of the amount of



There are many tips and tricks to use your water, but, all irrigation systems take time and money to optimize the use of this limited resource effectively.

Here, we've provided some information to get you thinking about this resource and some strategies for improving irrigation water use along with resources to explore for additional questions and information.

Irrigation: Understanding Your Resource

When can I Irrigate?

April first through October first is the typical irrigation season for most water rights. Check your water right with Oregon Water Resources Department or contact your Irrigation District or Ditch Association about when you can start, and when you are allowed to irrigate during the season.

On-Rotation means you are held to a strict rule of irrigating a certain number of hours in a given time period. This is typical for most flood irrigators or larger sprinkler irrigators because of the large flow rate needed, on the order of 1 to 3 Cubic Feet per Second (aka. 'feet', CFS).

On-Demand means you are able to irrigate whenever you want, when your crop needs it. This is typical for most smaller sprinkler or drip irrigation systems because the flow rate is typically less, on the order of 5 to 10 Gallons per Minute per Acre (GPM/Acre).

Principles of Irrigation

- **Frequency**—How often do I irrigate?
- **Duration**—How long do I leave the water on?
- **Intensity**—How much flow rate can I use?

Adjust the frequency of irrigations, or the duration of the irrigations. Less frequent, lower duration in spring and fall when the crop water needs are less.

How much water can I use?

The water right attached to your land dictates the amount of water you are able to use, based on the amount of acres irrigated from the location of the water source (Point of Diversion, or Turnout) There is a maximum flow rate and maximum total volume.

A maximum flow rate of 5.6 GPM per Acre continuously is a typical water right (1/80th CFS per Acre). Some older water rights allow for up to 11.2 GPM per Acre (1/40th CFS per Acre).

Typical sprinkler or drip irrigation systems are designed with a flow rate of 8 to 10 GPM per Acre in this area based on climate and typical operating times.

Flood irrigation systems require a large flow rate, over a short period of time, about at least 1 CFS (450 GPM), to push water all the way across the field. 1 CFS can irrigate 8 Acres in 24 hours, with 3 inches of water. In Jackson County, most flood irrigation comes directly from open canals, there are few, if any, flood irrigation systems pumping from ground water.

1 Million gallons of water, per acre, each year, is about the amount of water needed for irrigation in this region for most crops. This is about 3 Acre-ft (36 Acre-inches) of water needed per acre. A maximum volume of 4.5 Acre-ft of water per year is typical for most water rights.

How much does Irrigation Water Cost?

Within an Irrigation District, costs for irrigation water are typically a fixed annual cost at about \$50 to \$100 per acre regardless of the amount of water used. Expect these fixed costs to increase by a small percentage over time to account for inflation..

If a pump is used to supply water for irrigation, an additional electrical and maintenance cost of about \$100 per acre may be typical for sprinkler irrigated hay. Less or more depending on crop type and the total volume of water applied in the season.

Irrigation Rotation Schedule
103.2 ACRES
14 days
336 total hours of water
You should be able to irrigate 10 acres in 24 hours
April 24, 2014 Start

STATE OF OREGON

COUNTY OF JACKSON

CERTIFICATE OF WATER RIGHT

that the amount of water to which such right is entitled is the amount actually beneficially used for said purpose; second for Tract No. 1 and 0.40 cubic feet per second at the head of the ditch or point where the water is diverted; April 1st to October 1st of each year;

Irrigation: Optimizing Your Resource

Irrigation Types

Flood Irrigation



Sprinkler Irrigation



Drip Irrigation



What is Flood Irrigation?

Flood irrigation, is an irrigation method employing gravity to move water down and across the area to be wetted.

Flood irrigation in Jackson County is typically characterized by the following:

- Pasture and hay are the typical flood irrigated crop. Contour ditches, wild flood or border strip type flood irrigation is typical.
- Large volumes of water are placed onto the field from canals or head ditches, for a certain amount of hours, once every 2 weeks. ‘On-rotation’.
- Difficult to use efficiently and difficult to get even distribution of water on the field. Water will flow off the end of the field and there are usually dry and wet areas.
- Lowest startup cost, especially if the land was historically flood irrigated.
- Water Quality Concerns. Excess flood irrigation water (Tailwater) can pollute nearby rivers and streams with bacteria, nutrients and warm water.

Ways to Improve Flood Irrigation?

- Spend more time in the field when you irrigate. Flood irrigation is more of an art than a science, meaning that timing and flow rates change and shifts throughout the season. Learn where all the water goes and adjust ditches accordingly. Do not just open the headgate and leave.
- Clean out all the vegetation from your ditches and compact ditch bottom and side. Vegetation slows the water down and is not efficient. Use a water safe herbicide sprayed prior to irrigation starting, or use mechanical means throughout the season.
- Keep livestock out of ditches. Livestock trample ditches making water management difficult. Use fencing, hardened access areas or stockwater tanks.
- Replace open ditches with Gated pipe to help improve management, increase efficiency and reduce ditch maintenance.
- Talk with a neighbor who does a good job flood irrigating and ask for some tips and advice. Ask about hiring an experienced irrigator to irrigate your field for you.
- Shut water off and move water to next location before it reaches the end of the field. This will improve efficiency and prevent dirty irrigation water from running off the end of the field.

Don't flood irrigate simply to keep your water right valid. You only need to irrigate all of your irrigated acres once every 5 years.

Only flood irrigate if you have control over your irrigation water. Consider not irrigating or leasing water in-stream if you don't have the ability to irrigate.

Contact JSWCD's Soil & Water Conservation Engineer for a site visit and consultation on improving your flood irrigation.

Irrigation: Optimizing Your Resource

What is Sprinkler Irrigation?

Sprinkler irrigation is a mechanical method that uses medium to high pressure water forced through a nozzle to cover the area in water droplets.

Sprinkler irrigation in Jackson County is typically characterized by the following:

- Typical crops irrigated by sprinkler are hay, alfalfa, pasture grass, some hemp and other specialty row crops.
- Types include: Wheel lines, handlines, pods, center pivots, linear moves, solid set, big guns and water-reels. The best type to choose is based on the available labor, personal preference, budget, land shape, crop type and soil type.
- New sprinkler irrigation systems can cost between \$2,000 to \$10,000 per acre. More expensive systems generally require less labor.



Ways to Improve Sprinkler Irrigation

- Know your system. What is the application rate (inches per hour)? What is the flow rate per sprinkler? What pressure is best for your sprinklers?
- Monitor soil moisture and crop water use using soil moisture sensors, or a step probe. Save pumping costs by only irrigating when you need to.
- Maintain equipment by replacing worn fittings and broken sprinklers each season. Use the same size sprinkler throughout the system. Replace old brass impact sprinklers with new plastic rotator sprinklers.

What is Drip Irrigation?

Drip irrigation is a micro-irrigation system of low pressure and low volume where water is applied as drops or small streams from emitters.

Drip irrigation in Jackson County is typically characterized by the following:

- Typical crops irrigated by drip are vineyards, hemp, orchards, vegetables, fruits, hops, and other specialty row crops.
- Types include: single use drip tape, permanent drip tube, drip emitters, and subsurface drip.
- Extremely efficient, but also one of the more expensive irrigation systems.



Ways to Improve Drip/Micro-Irrigation

- Filtration is very important so spend the extra money to get the better filter up front. Clogging is the main cause of problems for this type of irrigation.
- Use more irrigation zones or blocks to reduce costs.
- Place drip tape on both sides of the crop to increase the wetted area and reduce water stress.
- Always flush lines each season.
- Use a pressure reducer before all drip tape.

Additional Information

- JSWCD can assist with improving your existing irrigation through whole farm planning, grant writing, mapping, and design assistance.
- Contact a local irrigation contractor for designs, cost estimates and installation.
- Online Irrigation Resources:
 - Irrigation in the Pacific Northwest. Irrigation.wsu.edu
 - ATTRA, National Center for Appropriate Technology (NCAT) Irrigation. Attra.ncat.org
 - Oregon State University Extension. Extension.oregonstate.edu