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THE CASE FOR IRRIGATION TAILWATER REUSE IN SOUTHERN IDAHO

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About half of the irrigated land in southern Idaho is furrow irrigated. With furrow irrigation, a portion of the irrigation water runs off the tail end of the field. Some runoff is necessary to adequately irrigate the whole field. In the Magic Valley, farmers run 20% to 50% of their irrigation water off their fields into tailwater ditches. Twenty percent runoff is about the minimum possible on the local soils and slopes. Fifty percent indicates poor management. Average tailwater runoff from a furrow-irrigated farm is about 40% of the water supplied to the farm.

When water runs down furrows, it picks up soil. The predominate silt loam soils in southern Idaho are extremely erodible and field tailwater carries with it about a cup of soil with each 25 gallons of water. This is equivalent to 5 tons of soil per acre each year. With the top soil comes weed seeds, plant residues, agricultural chemicals, and plant pathogens such as nematodes and fungi and diseases such as rizomania.

The soil and its passengers end up in one of three places: 1) drain ditches and irrigation laterals, 2) other farmers' ditches, pipes, and fields, or 3) the Snake River and its tributaries. The Twin Falls and North Side Canal Companies dredge about 400,000 tons of sediment from their canals each year, at considerable cost to their shareholders (farmers). Farmers whose water supply includes tailwater from upstream farm fields continually contend with the sediment that accumulates in their ditches and pipes and wears out their pumps and sprinkler nozzles. They must deal with other farmer's residues and trash that plug up their gates and siphon tubes and weed seeds that germinate in their fields. They also must be aware of the potential of their crops catching other farmers' plants diseases or being hurt by other farmer's herbicides.

By the time tailwater reaches the creeks and river, although the volume has shrunk, much of it has been "used" several times and it carries thousands of tons of sediment. The damage this sediment and the nutrients it carries has caused are now obvious. The changes required to clean up the river are now being determined. One change may be regulation of irrigation runoff quality.

Farmers, with the urging and assistance of their Soil Conservation Districts and the USDA Soil Conservation Service and Agricultural Stabilization and Conservation Service, have tested and implemented many *Best Management Practices* to reduce the amount of sediment that leaves their farms. These include reduced tillage to reduce erosion and sediment traps and ponds to capture sediment before it leaves the farm. These practices can dramatically reduce sediment in tailwater. However, their use still is not widespread. Many farmers are converting their furrow irrigated fields to sprinkler irrigation. A well designed and operated sprinkler system conserves water and produces no runoff. The main disadvantage to sprinklers is the high

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equipment and energy costs. A sprinkler system typically costs $400-$600 per acre to install (if 3 phase power is available) and $20-$30 per acre per year for electricity.

TAILWATER REUSE

An alternative management practice for furrow irrigated land that can eliminate farm runoff is tailwater reuse. Irrigation tailwater reuse is the collection, storage, and reapplication of runoff from irrigated land. This is not a new practice. It is used in many water-short areas, including the Salmon Tract south of Twin Falls, to conserve water. In south-western Nebraska and the high plains of Texas, tailwater reuse is mandated to reduce groundwater drawdown. In some areas in California, reuse is required to control pollution.

In a typical tailwater reuse system, the tailwater from a farm is collected in one or more ponds. When enough water is collected, it is used for irrigation. This usually requires a pump and buried pipeline to pump it back to the head ends of fields. The main costs associated with these systems is the pipe and pump, extending electric power to the pump, and cleaning sediment from the pond. Tailwater systems typically cost about $100-$200 per acre. Power costs for the low-pressure pumps are small - about $3.00 per acre per year.

The benefits of irrigation tailwater reuse for Idaho farmers and the public are many. The public benefits because damages caused by tailwater sediments in the rivers are eliminated. The canal companies benefit because they spend less money cleaning drains and canals. The canal companies also benefit because it is easier to operate and regulate the canal system without having to deal with unpredictable tailwater return flows from farms. The change will require policy changes and operational adjustments in canal operation (similar to those required with conversion to sprinklers). Some of the water that presently runs off farms and back into downstream laterals must be left in the canals to supply downstream farmers. This should require few physical changes to the system.

The farmers gain for several reasons. They will no longer have to deal with dirty water from upstream farmers, and the trash and weed seeds it carries. And downstream farmers will no longer have to deal with their used water. Farmers can claim to the public that their on-farm irrigation water use efficiency is perhaps 70%, as compared to less than 40% when tailwater ran off the farm. They can, with heads held high, show that they have taken a big step towards protecting the environment in which they live - that they are no longer a major contributor of sediments and pollutants to the river. Tailwater reuse farmers also improve some of their water management options. The reservoir storage allows them to shift some of their water from times when they don't want to use it to times when they do. By collecting all runoff water and sediment, they don't have to be so careful about setting their water flows precisely. By collecting runoff, it is easier to measure and account for water applications. By keeping their soil on the farm, they are improving the long term productivity of their farm.

I believe that some southern Idaho irrigators may be required, in the near future, to reduce the amount of sediment leaving their farms. They can take the lead and propose and implement programs, or they may be regulated. Tailwater reuse is an option that would produce the required results and can provide benefits to the farmers. It may, in the end, be the only alternative to converting to sprinkler irrigation.