A case study of small sediment basins to control irrigation-induced erosion in Willow Creek, Malheur County

Simple

- The sediment basins captured a total of 172 pounds dry weight of sediment per acre for one irrigation.
- Turbidity and suspended solids fell by 65% after the water passed through the first sediment basin.

Controlling irrigation-induced erosion has long been a problem for farmers in northern Malheur County. However, if you give farmers a problem and some time to work on it, the chances are, they will find a simple and effective fix.

Landowners in the Willow Creek area have been experimenting with a new design for sequenced catch basins, small basins designed to catch sediment at the end of the field.

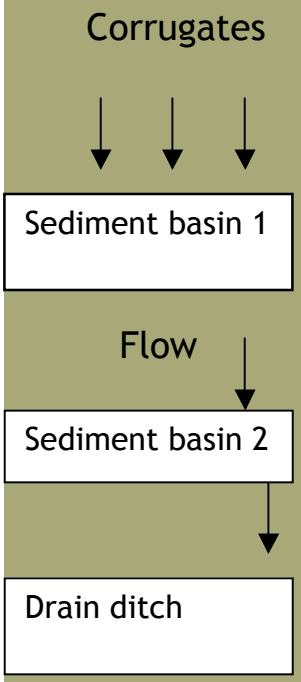
Their design incorporates water running through two settling basins before it empties into the main drain ditch, rather than the traditional single basin approach.

The two basin design is easier to install and maintain. All the farmer has to do is create two deep furrows at the end of the field using a terracing blade. To create the individual sediment basins, the farmer lifts the blade at selected spots, which drops dirt to create the end walls.

If installation is easy, maintenance is even easier. Once the basins are full, the farmer can level out the ground and re-plow the two furrows just as before.

This design eliminates pipes and other permanent structures that make maintenance more difficult. At the end of the season, or prior to planting the next year, the farmer can use the dirt accumulated at the end of the furrows to help level the field.

Schematic of Sediment Basins



Effective

To test the effectiveness of this concept, staff from the Malheur County Soil and Water Conservation District, the Malheur Watershed Council, and the Oregon Department of Agriculture collected a number of water quality samples in the summer of 2003. They measured turbidity and estimated the amount of soil trapped in the basins.

Samples taken when the irrigation water first reached the end of the corrugates were turbid and full of suspended solids.

More samples were taken after 24 hours of irrigation. Turbidity and suspended solids fell by 60 percent after the water passed through the first sediment basin.

All the farmer has to do is create two deep furrows at the end of the field using a terracing blade.

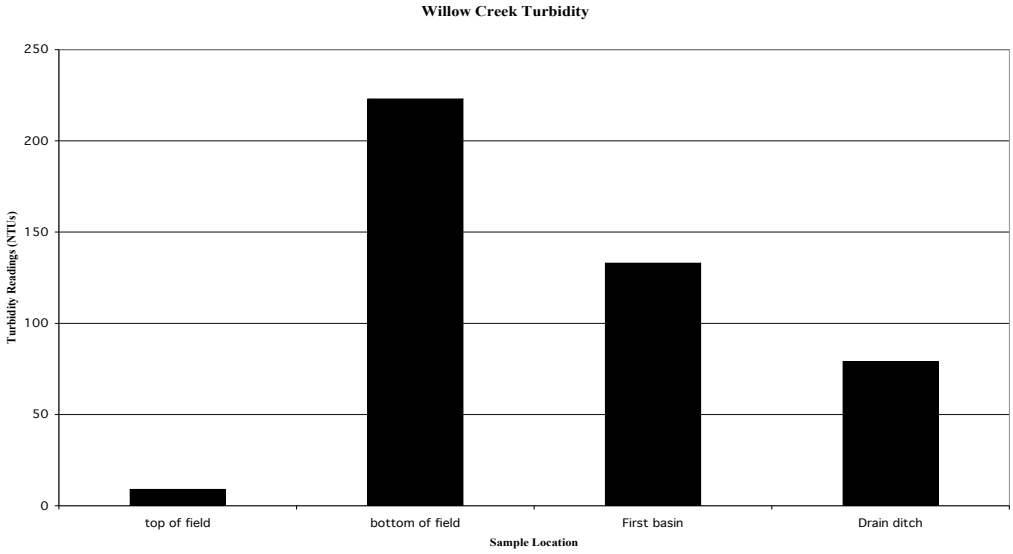
Productive

Turbidity readings provide useful information, but what is important is the actual amount of soil captured by the basins during this 24-hour period. We estimate the sediment basins captured a total of 57.3 pounds dry weight. This equates to 172 pounds per acre per irrigation.

Before installing the sediment basins, this soil would have eventually been delivered to Willow Creek. Now the farmer can easily move the dirt to low spots in the field at some future date. This will help preserve the field's productivity and will make future irrigation more efficient, because it is easier to furrow-irrigate a level field.

The farmer has saved this soil collected in the first sediment basin. It can be used to re-level the field at year's end.

Turbidity readings from a sediment basin study



What is important is the actual amount of soil captured by the basins.

Conclusions

This technique of multiple temporary sediment basins has many advantages. It is simple to install and easy to maintain.

Our measurements show that the basins can capture 172 pounds of sediment per acre per irrigation. Turbidity readings are reduced by more than 60 percent.

This means that water quality is being protected and an additional benefit to the farmer is soil retention and protecting the field's future productivity.