Strategically Reducing Phosphorus from Irrigation in the Malheur and Snake Rivers

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Two total maximum daily loads (TMDLs) state that phosphorus levels in the Malheur and Snake Rivers must be reduced by at least 80% to meet targets in the Snake River. The TMDLs identify irrigation runoff and erosion as the primary transport mechanisms. Northern Malheur County, Oregon, is heavily agricultural, with 143,000 acres of row crops, pasture, and livestock. Four irrigation districts deliver water through a complex system of canals, ditches, drains, and pipelines to the majority of the acreage. This system was designed 100 years ago to rely on flood irrigation and water re-use; irrigation water is collected in drains and may be reused up to seven times before flowing into the Malheur River. In addition, much of the water that flows off one district is reused by another. Agricultural land use and water delivery systems in one district can significantly affect water quality and water availability in other districts and in rivers. To strategically address load allocations, we need to understand irrigation infrastructure and water quality, prioritize areas for improvement, inform irrigators about water quality, implement projects, and track resulting improvements in water quality. We mapped infrastructure for the three largest districts and then focused on the irrigation district that receives water from the adjacent districts and drains directly into the Malheur River. We:

- Sampled 40 sites for E. coli, nutrients, sediment, and flow to calculate pollutant loads;
- Analyzed data in GIS;
- Delineated ‘drainsheds’ in GIS;
- Combined GIS and water quality data to inform discussions; and
- Selected priority areas.

The project has encouraged irrigation districts to work together to address water quality issues. It has also increased awareness of water quality and conservation issues in Malheur County and helped prioritize areas for assistance. However, the scope of the issue and the complexity of addressing it continue to be significant challenges.