



Considering Irrigation Water Sources

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Irrigation water is important for effective and efficient production of many crops. Ensuring the quality of that water safeguards your crop from contamination that could later cause foodborne illness. Both the source and the method of irrigation influence the risk to the crop.

This guidance document addresses relative risks associated with irrigation water sources and delivery methods. It will also discuss the frequency of testing each source. Writing a “Water Usage and Quality Risks Policy” and interpreting water test results for GAP compliance will be discussed in future episodes.

Whether you get your irrigation water from a pond, stream, well or municipal source, you should be aware that when it comes to food safety not all water sources are created equal. Growers are encouraged to consider the relative risk of irrigation water sources, choose their source and then actively manage to protect it from contamination by human, livestock and wildlife waste. The following bullets provide guidance.

- *In general, well water is less vulnerable to microbial contamination than surface water. Deeper wells are less vulnerable than shallower wells, however good wellhead protection and maintenance practices are necessary to protect all wells.*
- *Ponds used as irrigation sources for fresh produce should be entirely under grower ownership to control the immediate watershed of the pond. Exclude livestock and be aware of any nearby septic drain fields. Dense buffer strips of grasses and shrubs can help deter geese.*
- *Growers quickly lose control of potential contamination sources when irrigating from streams and lakes due to the size of the watershed and the multiple owners involved. Irrigating from lakes and streams reduces the chance of being GAP compliant if the grower can not demonstrate protection of irrigation water from “potential direct and non-point source contamination.”*
- *Using a municipal water supply for irrigation may be costly but is generally considered very safe because municipal systems must meet federal drinking water standards. Use of a municipal water source should guarantee full GAP compliance.*



Irrigation systems

Choice of irrigation delivery method influences the potential for irrigation water to come in contact with fresh crop. Again, growers should consider relative risk – less contact means less opportunity for microbial contamination. Overhead systems have value for frost control but may introduce microbial contaminants to the crop for irrigation. Drip irrigation significantly reduces the risk of contact. Flood irrigation is rarely used in Michigan, but offers similar risk reduction as compared with overhead irrigation.

Water quality

All GAP auditing schemes and FSMA require that some form of water quality testing has occurred. Testing for generic *E. coli* bacteria is largely considered an acceptable baseline water quality test. Generic *E. coli* is an accepted indicator of the presence of fecal material from the gut of a warm-blooded animal. (Do not bother testing for coliform or fecal coliform bacteria.)

It may be important that the actual number of bacteria be determined in the testing of irrigation source water. Because some *E. coli* are allowed in irrigation water, simply testing for the presence of generic *E. coli* may unnecessarily limit the use of some sources if they come back “positive” for generic *E. coli*. Depending on the laboratory method used, test results may be expressed in colony forming units per 100 ml water (CFUs/100 ml) or as a Most Probable Number (MPN). If the auditing scheme specifies, you may also wish to test specifically for the pathogenic strain *E. coli* 0157:H7 so check with your auditor before testing.

Wells should be tested once a year. Surface waters should be tested three times a year for GAPs; at planting, at peak use, and at or near harvest; or five times for FSMA; at or near harvest and not all on the same day. Keeping municipal water test results on file from the water authority is acceptable in lieu of testing municipal sources. Testing of both wells and surface water sources should be done at the closest point of emission to the crop. Very little research has been done on the persistence of microbial pathogens inside irrigation equipment, so testing them at this point provides information on the entire system, including the water source.

You can find copies of the water testing log sheet in our show notes as well as a list of private water testing labs in the state. Your county health department provides a connection to the State of Michigan laboratories and have testing bottles and instructions available. Always put test results in the food safety Manual AND note when and where you took the sample on the log sheet.