

Handout - What's in Your Water and How to Get the Bad Stuff Out, Tom Fernandez

Testing Water

- Typical in-house testing capabilities
- Desired laboratory test capabilities
- How and when to sample
 - Sample collection
 - Water source: surface, groundwater, municipal, recycled
- Selecting a lab

Desired Source Water Quality Ranges (excluding recycled water)

Component	Ideal Range (mg/L)	Acceptable Range (mg/L)
Total Alkalinity (CaCO ₃ equivalent)	40 - 80	< 200
Bicarbonate (HCO ₃)	Combined for Total Alkalinity	
Carbonate (CO ₃)		
pH	5.5 – 6.5	4 – 10*
Soluble Salts	0.2 – 0.75 dS/cm	0 – 1.5 dS/cm
Ammonium (NH ₄ – N)		< 10
Nitrate (NO ₃ – N)		< 75
Potassium (K)		< 100
Calcium (Ca)	25 – 75	< 150
Magnesium (Mg)	10 – 30	< 50
Sodium (Na)	0 - 20	< 70
Phosphate (PO ₄)		< 90
Sulfate (SO ₄)	0 – 120	< 240
Chloride (Cl)	0 – 20	< 100
Iron (Fe)	< 1	< 4
Manganese (Mn)	< 1	< 2
Boron (B)	< 0.1	< 0.5
Copper (Cu)	< 0.1	< 0.2
Zinc (Zn)	< 0.5	< 1
Molybdenum (Mo)	< 0.1	< 0.2

*pH outside of ideal range may affect mixing of some pesticides and soluble fertilizers

Example Water Analysis Reports

- Showing how they differ and what to look for

Common Issues in Michigan Water

- Alkalinity
- Soluble Salts
- Pests
- Agricultural Chemicals
- Suspended Solids
- Various Ions

Management of Common Issues

- Alkalinity
- Soluble Salts
- Pests
- Agricultural Chemicals
- Suspended Solids
- Various Ions

Less Common and Emerging Issues in Michigan Water

- Fluoride
- Boron
- Industrial Contaminants

Update on MSU Bioreactor Research

- Laboratory scale pesticide and nutrient dynamics
- Commercial scale pesticide and nutrient dynamics (more complete update see Marcela Tabares presentation during the MSU Research Update on Wednesday from 2 – 4 PM)