Tile Drainage Benefits, Risks and Ditch Maintenance Issues

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Overview

- ✓ Tile drainage benefits and risks.
- ✓ Tile outlets and ditch maintenance.
- ✓ Public and private tile outlet ditches.

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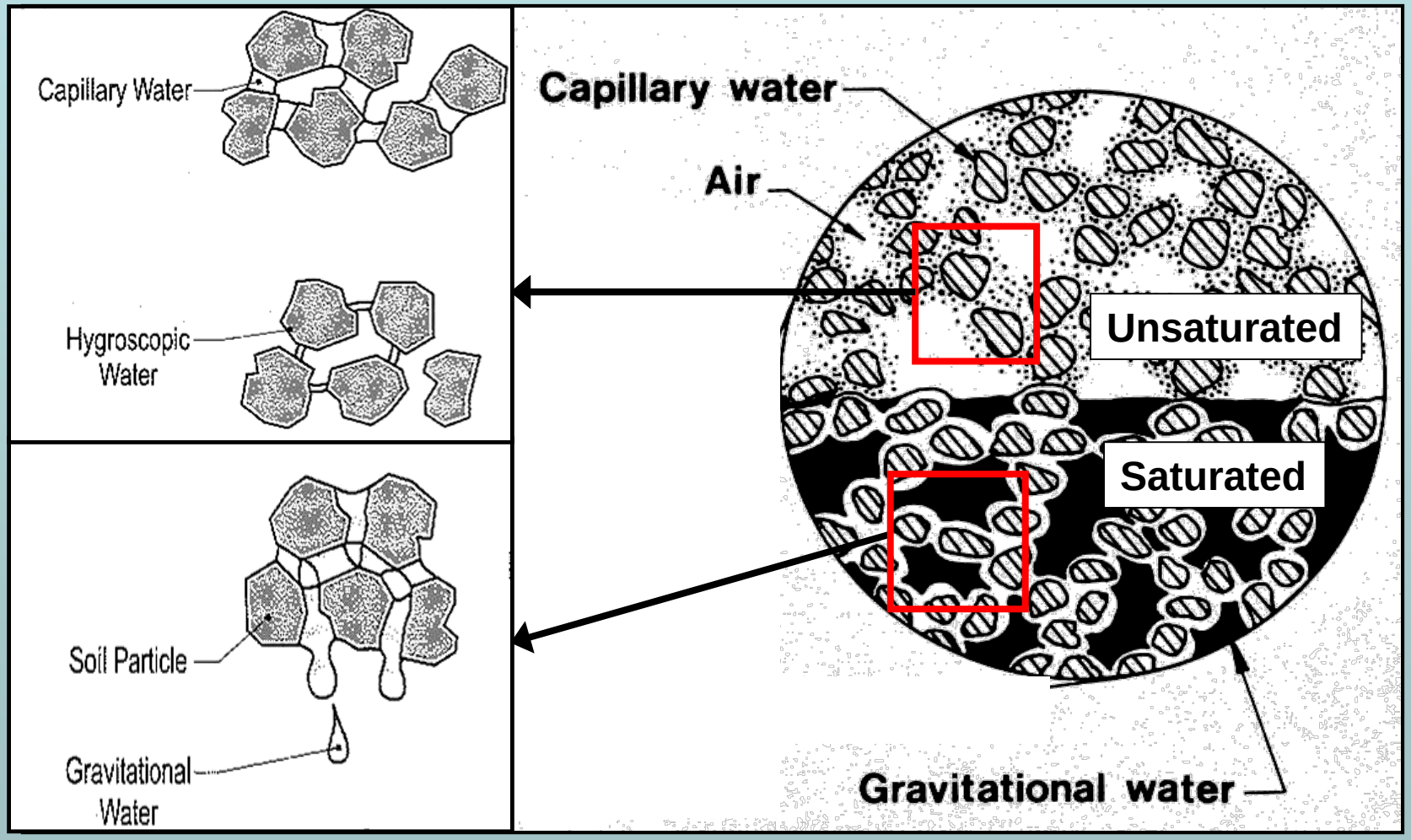
Water in the Soil Profile



Source: Sprinkler Irrigation Systems, Midwest Plan Service, MWPS – 30, 1999

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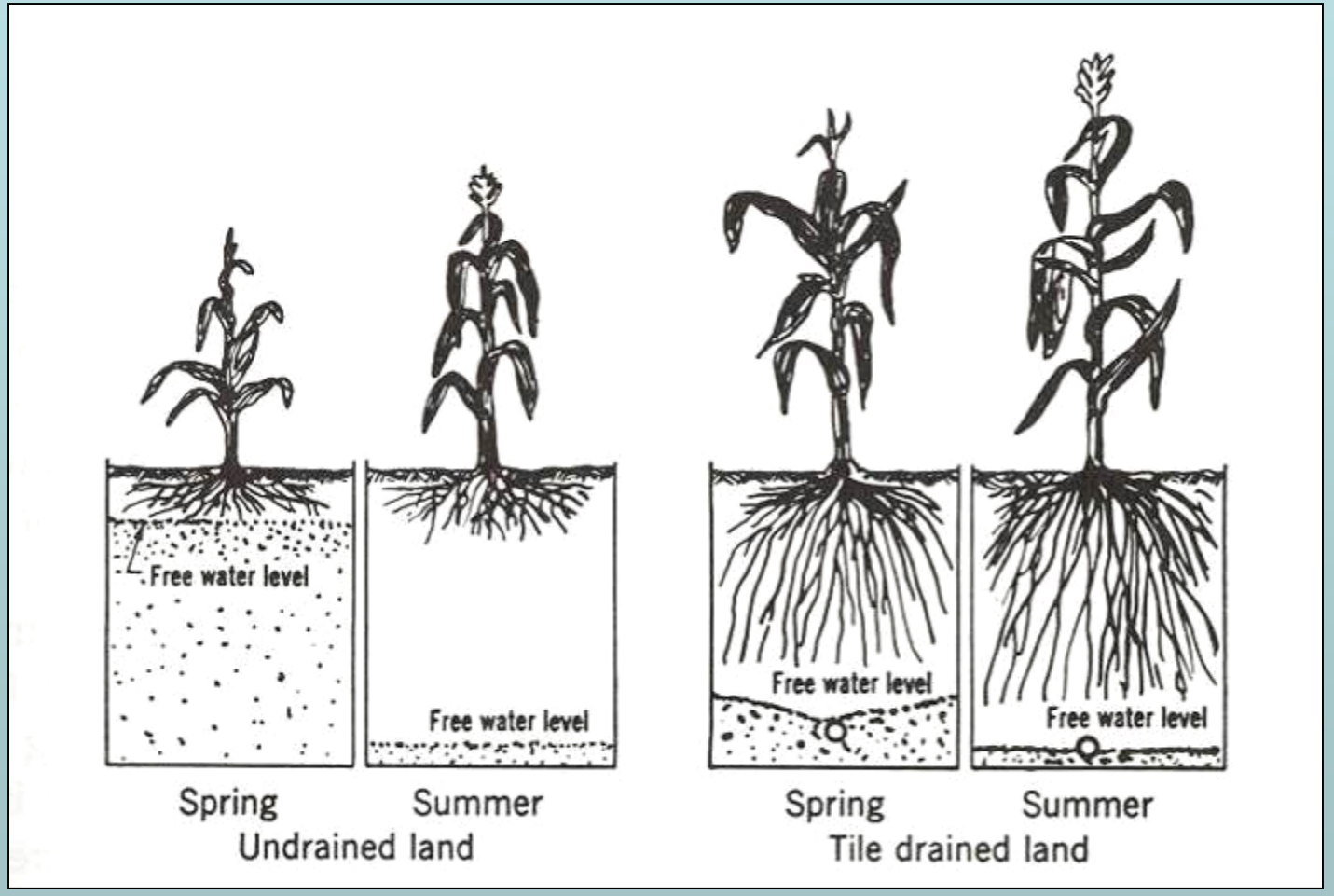
Learning for life

Benefits of Subsurface Drainage

- ✓ Maintain water table at proper level for healthiest plant growth (quality & yield).
- ✓ Keep soil voids free of excess water, which permits air flow and allows important biological processes to take place in soil.
- ✓ Maximize field equipment trafficability.

Benefits of Subsurface Drainage



Improved Root Development

Benefits of Subsurface Drainage

- ✓ Greater soil water storage capacity.
- ✓ Conserve topsoil by reducing runoff.
- ✓ Raises soil temperature

  Dry soil is warmer than wet soil. It takes 5 times as much heat to raise an equal volume of water 1° as it does to raise an equal volume of soil 1°.

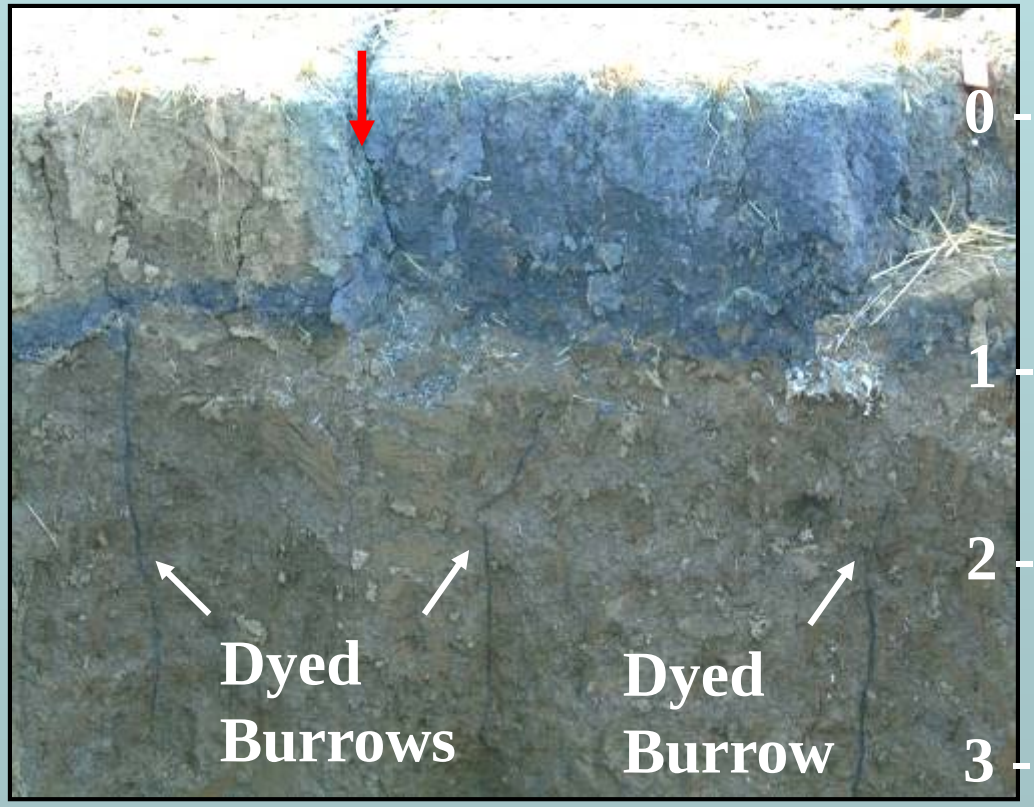
Environmental Risks of Tiles

- ✓ Increased export of nutrients (NO_3 and P), pesticides (Atrazine) and pathogens.
- ✓ Macropores (roots and earth worm holes) are natural direct conduits.
- ✓ Surface inlets act direct conduits to receiving waters.

Soil Macropores

Preferential flow

- Earthworm burrows
- Root holes
- Shrinkage cracks
- Structural porosity



Surface Inlets

- ✓ Increased potential for water quality impacts.
- ✓ Finer inlet screens and rock filters reduce sediment inflow

Hickenbottom Inlet

Surface inlets are direct conduits for runoff and any pollutants in that runoff into surface waters !!

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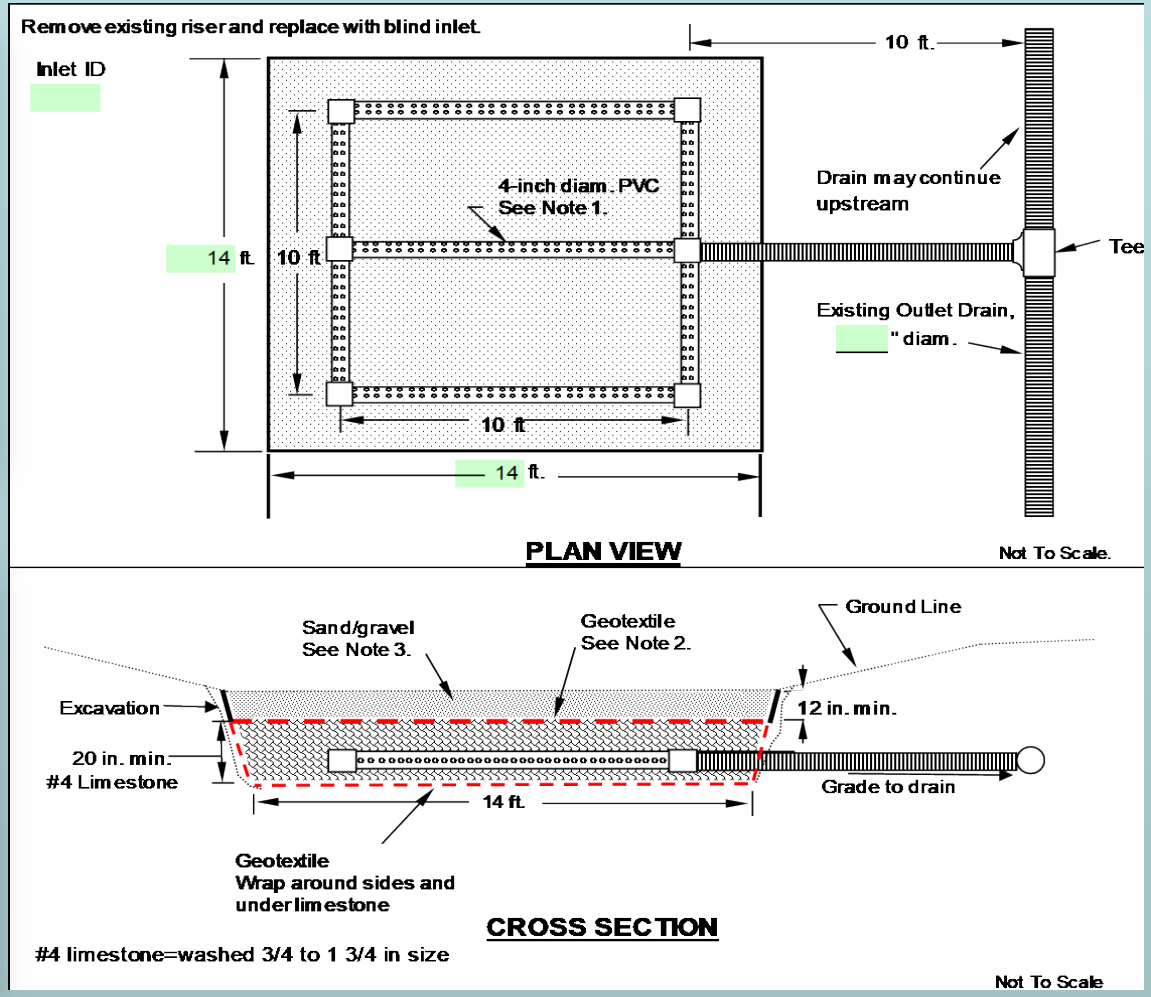
Use a Blind Inlet



Source: Dr. Doug Smith, USDA, ARS

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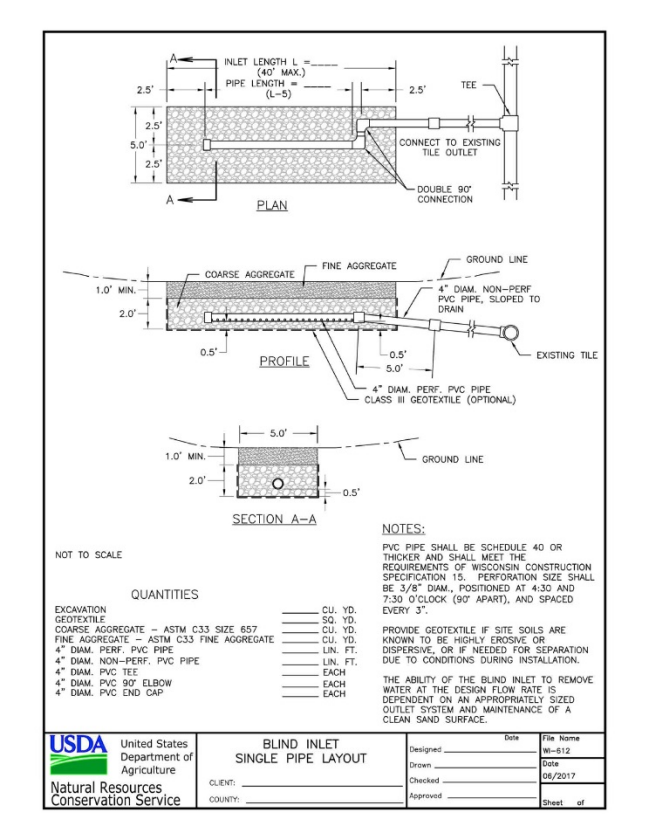
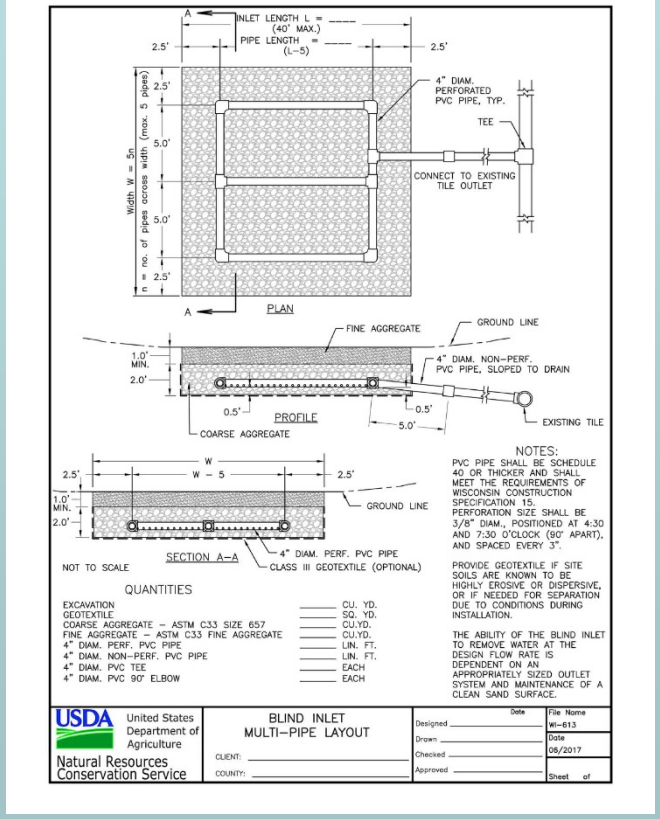
Use a Blind Inlet

- Wisconsin NRCS Standard -





Drawings 612 and 613 on blind inlets for tiles can be found in the Engineering Section of the WI-NRCS Home Page

Tile Drain Outlets

- ✓ MUST have sufficient grade for gravity flow !
  - If not, a pump station will be necessary.
- ✓ Receiving ditch must have adequate capacity.
- ✓ Provide guards to keep animals out.

- ✓ ASABE Standard - daylight outlet pipe 1 ft. above base flow in receiving channel.

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Ditch Maintenance

- ✓ Maintenance is needed when ditch flow depth (standing or flowing) covers tile outfalls to the degree that fields remain wet. This is site specific and grade (tile and land) dependent.
- ✓ Inspect annually and after larger (25 yr.) storm events.
- ✓ Removal of woody vegetation will likely be needed more frequently than sediment removal.

Photo courtesy of Discovery Farms

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Ditch Maintenance

- ✓ Permits or review may be required (WDNR, NRCS, USACE, county planning and zoning), less of a concern for maintenance than improvement.
- ✓ Maintenance of private ditches is the responsibility of individual land owner(s), can cause friction among land owners, (ex. downstream flooding, etc.).
- ✓ Many of these issues are addressed by the formation of drainage districts.

Photo courtesy of Discovery Farms

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WI Drainage Districts

WI Chapter 88 Drainage Districts

(Ch. ATCP 48, Wis. Admin. Code) and Statute (Ch. 88, Wis. Stats.)

DATCP Home > Drainage Districts

Drainage Districts

About a third of Wisconsin farms depend on constructed drains to remove excess water from their land. Most of these are operated by a single landowner or by voluntary cooperation among neighbors. However, about 10 percent of these drains are organized as drainage districts, governed by county drainage boards. The Wisconsin Department of Agriculture, Trade and Consumer Protection regulates drainage districts under Wisconsin law.

Approved consulting engineers

Annual reporting requirements

Training materials

Additional Resources

- Drainage program factsheet
- Interactive map of Wisconsin drainage districts
- Drainage board handbook
- List of approved consulting engineers
- WI Statutes Chapter 88
- Administrative rule ATCP 48
- Drainage Board Directory

Contacts

christopher.clayton@wi.gov
(608)224-4630

Any ditch maintenance or tile connections performed within a drainage district must be approved by the county drainage board.

Drainage program website:
https://datcp.wi.gov/Pages/Programs_Services/DrainageDistricts.aspx

Source: WI Dept. of Agriculture Trade and Consumer Protection

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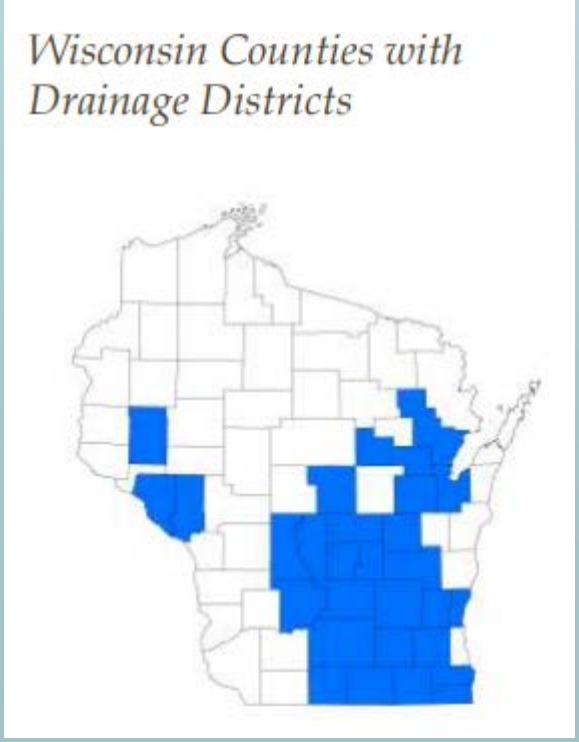
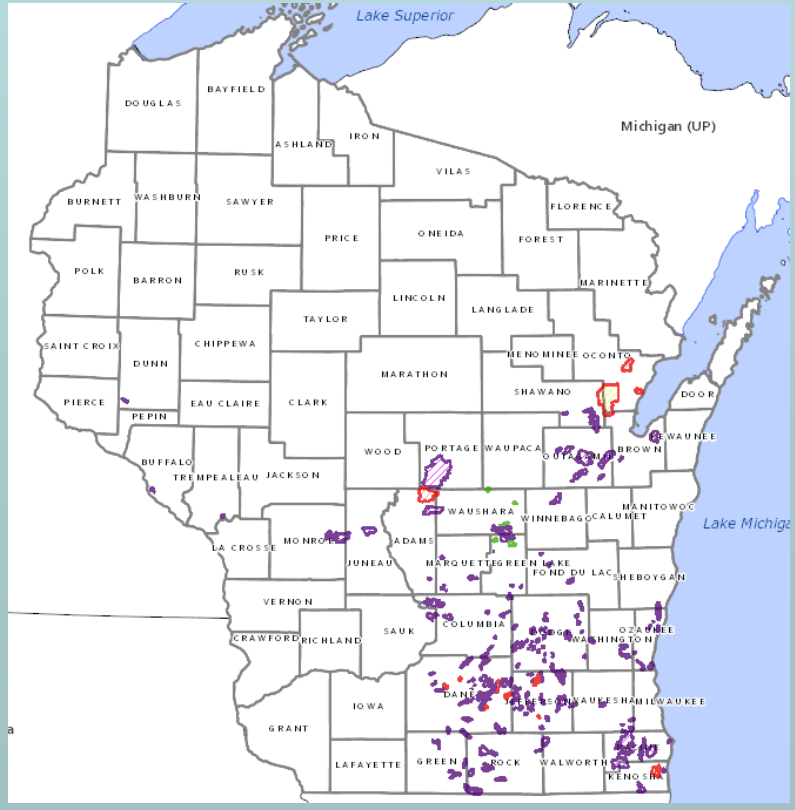
Wisconsin Drainage Districts

DATCP interactive web map that can be used to identify county drainage district boundaries.

https://datcpgis.wi.gov/maps/?viewer=dd





Source: WI Dept. of Agriculture Trade and Consumer Protection

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Tile Drainage Resources

- UWEX Tile Drainage Web Site -

fyi.uwex.edu/drainage/

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Questions ? ? ? ?


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