

# Ground Water Sensitivity— *Managing the Interface Between People and Ground Water*

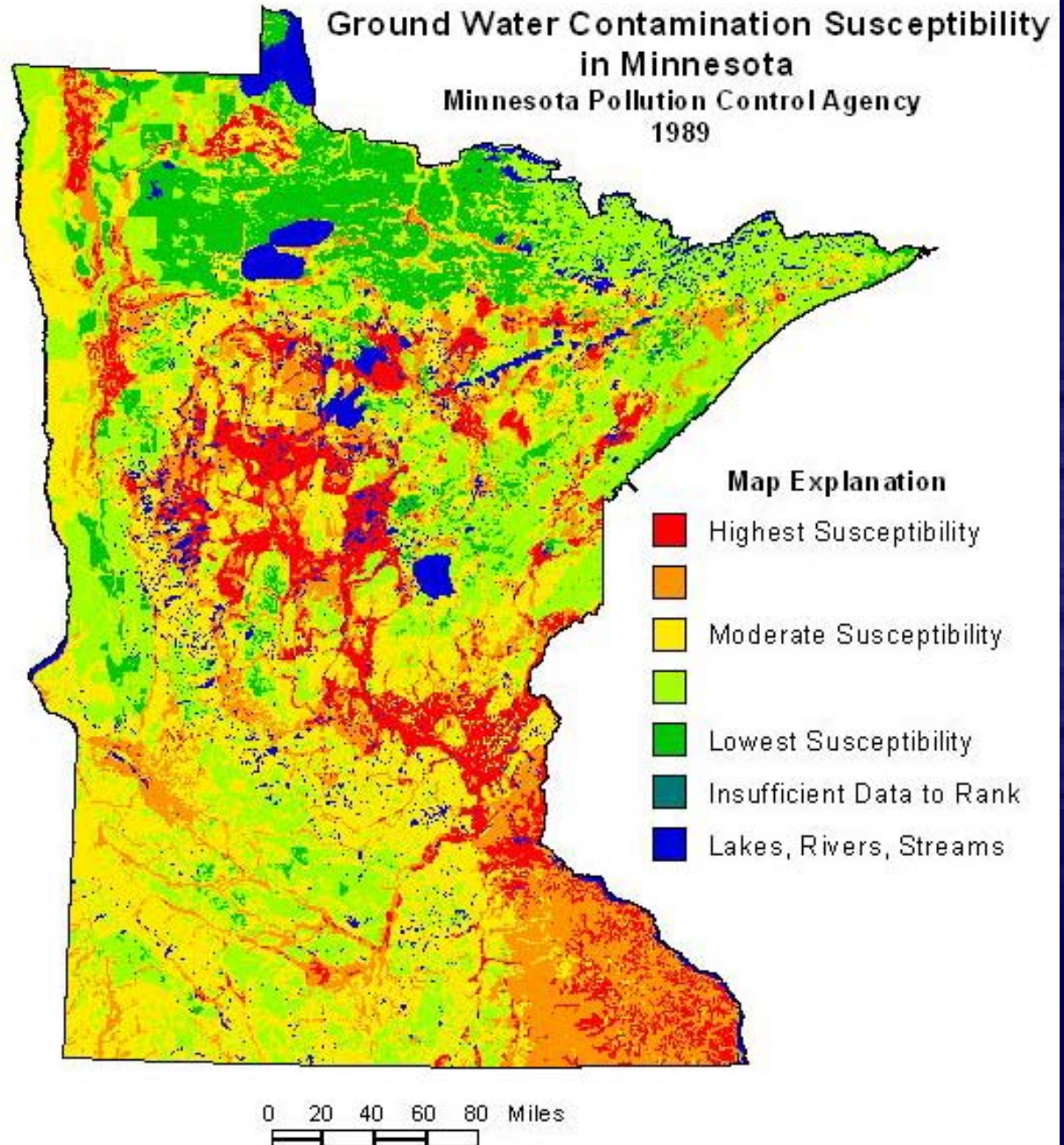
Jan Falteisek

Minnesota Department of Natural Resources  
Waters Division



## Four Factors

- Aquifer materials
- Recharge potential
- Soil materials
- Vadose zone materials



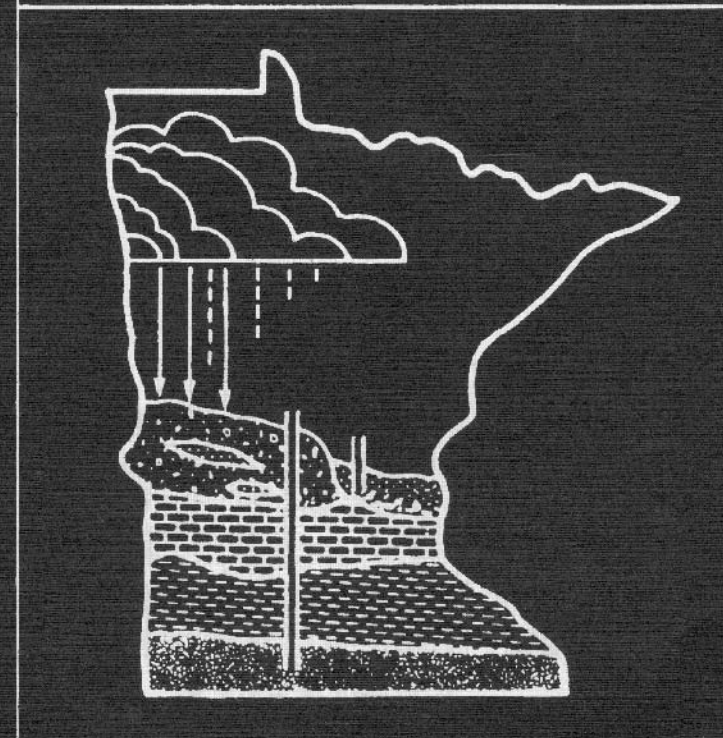
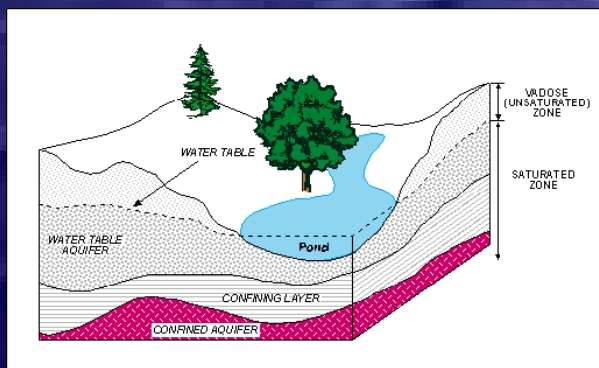
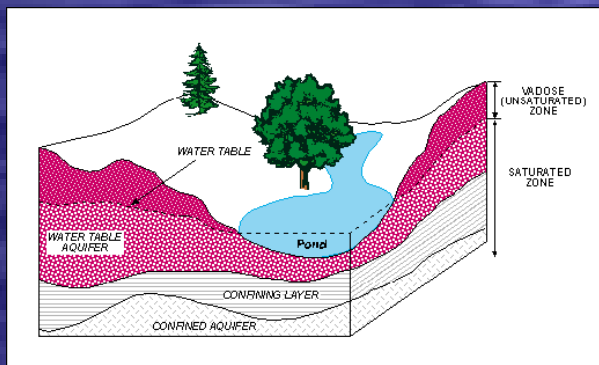
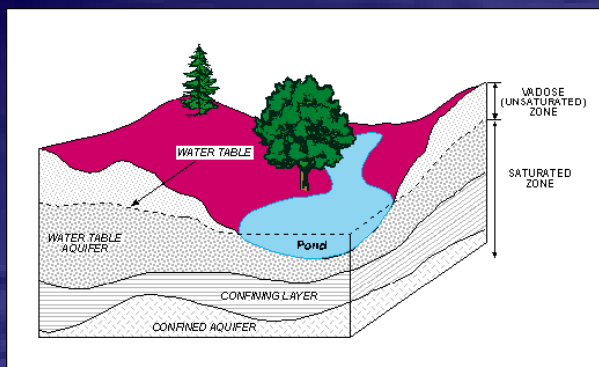
# 1989 Ground Water Act

“a geographic area defined by natural features where there is a significant risk of ground water degradation from activities conducted at or near the land surface”





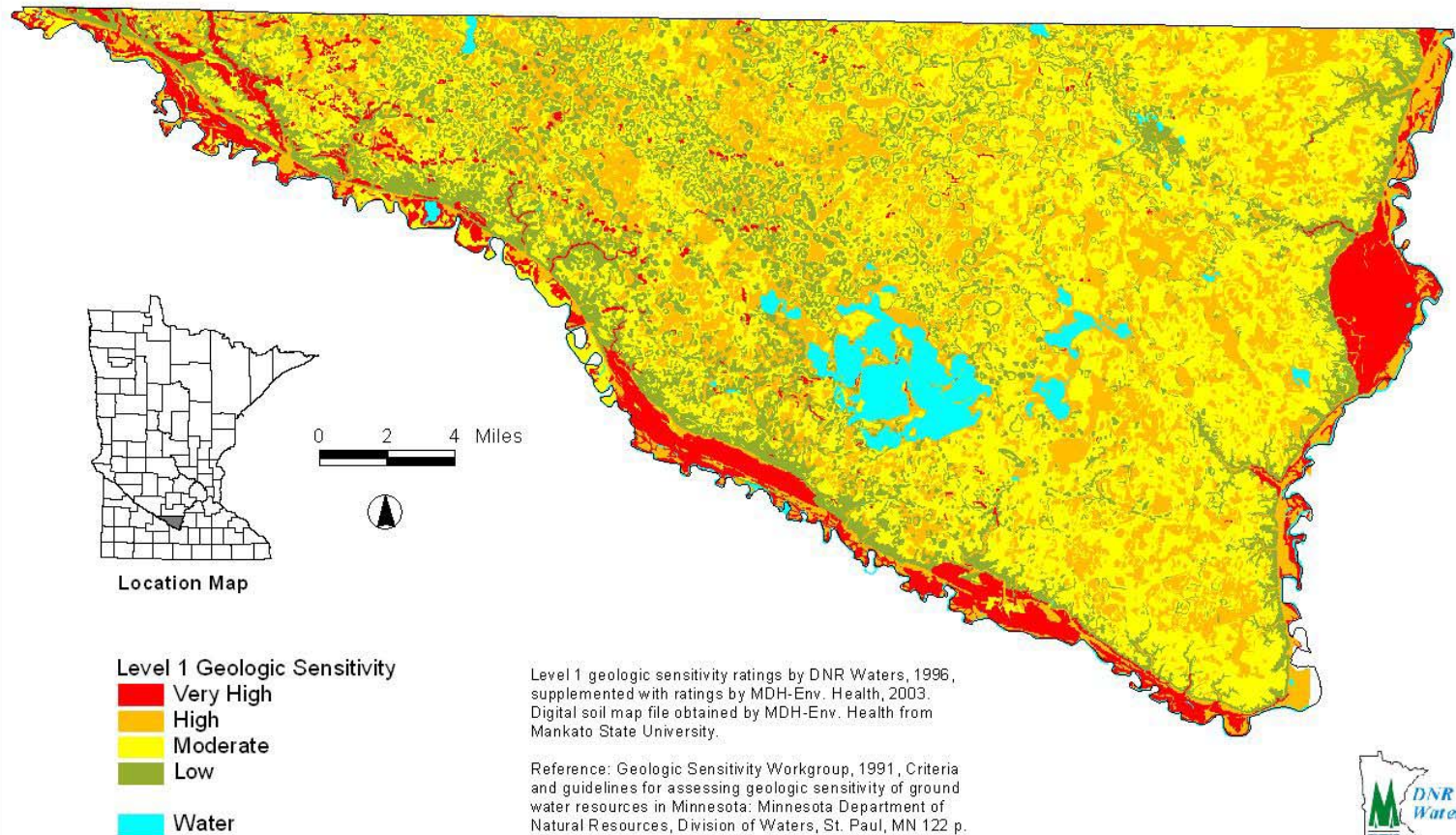
# Criteria and Guidelines for Assessing Geologic Sensitivity of Ground Water Resources in Minnesota



Department of  INNESOTA  
Natural Resources  
Division of  W aters

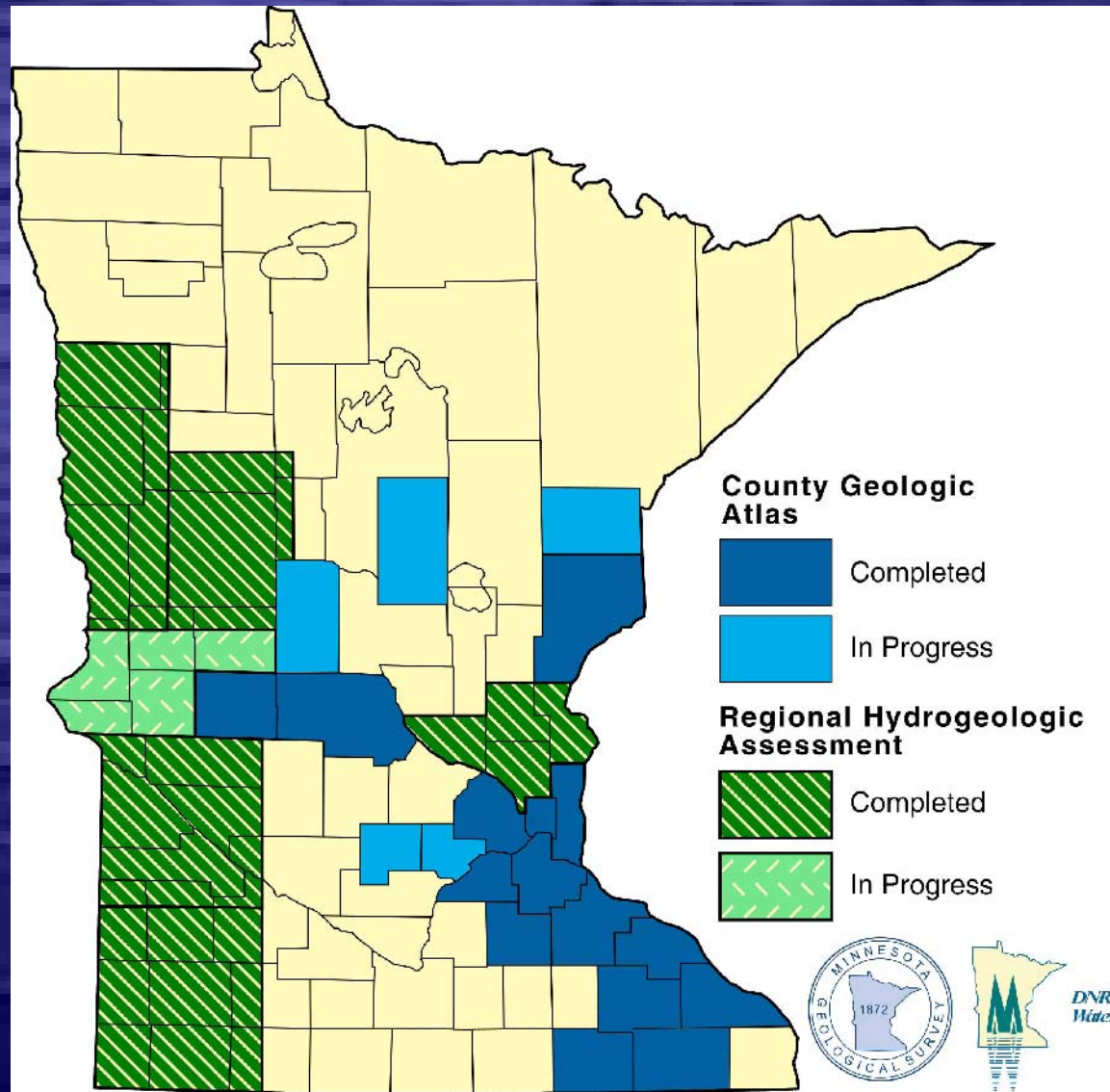
June 1991

## Level 1 Geologic Sensitivity Nicollet County, Minnesota





# County Geologic Atlas and Regional Hydrogeologic Assessment Project Areas

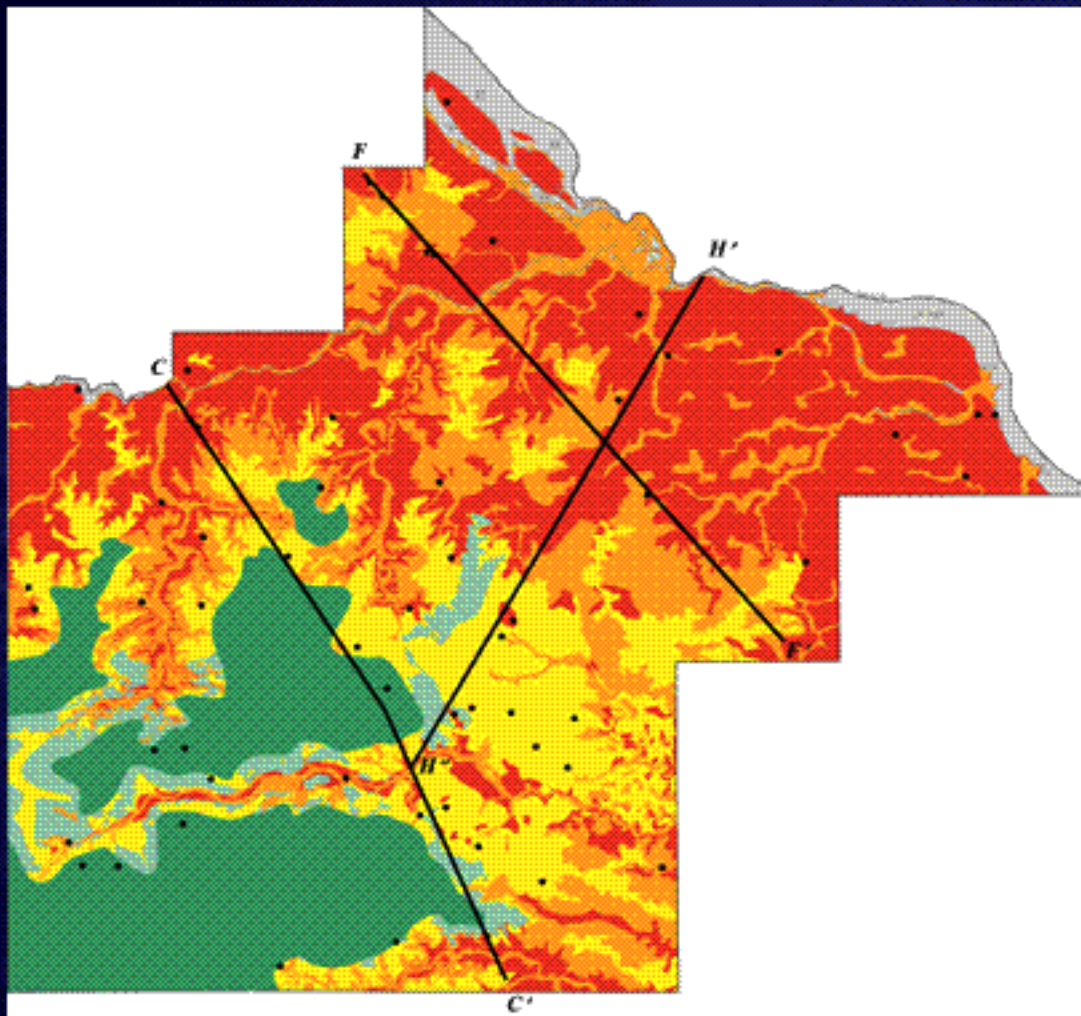


# Interpretive Maps Assist Ground Water Protection

- Public education
- Planning
- Provide context for decision-making
- Support regulatory actions
- Target areas of concern for action
- Monitoring program design



# Goodhue County

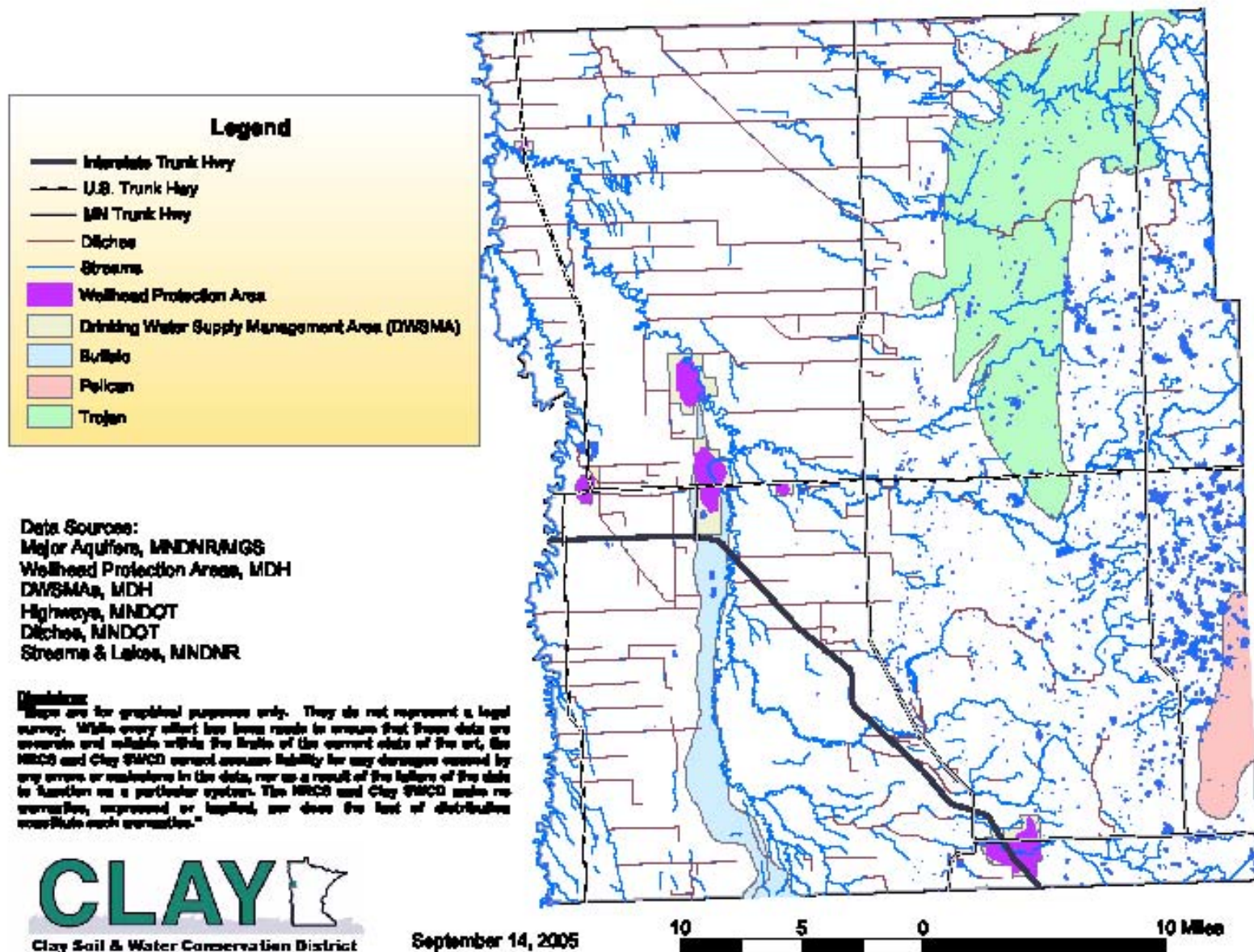


- Comprehensive Plan
- Planning Commission reviews
- Subdivision proposals
- Conditional Use Permits
- Zoning/rezoning

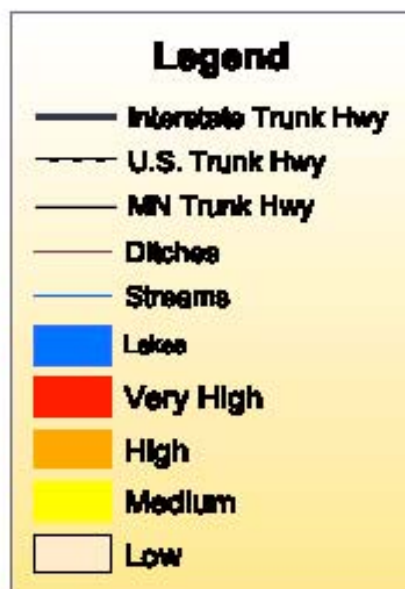




# GROUNDWATER RESOURCES OF CLAY COUNTY

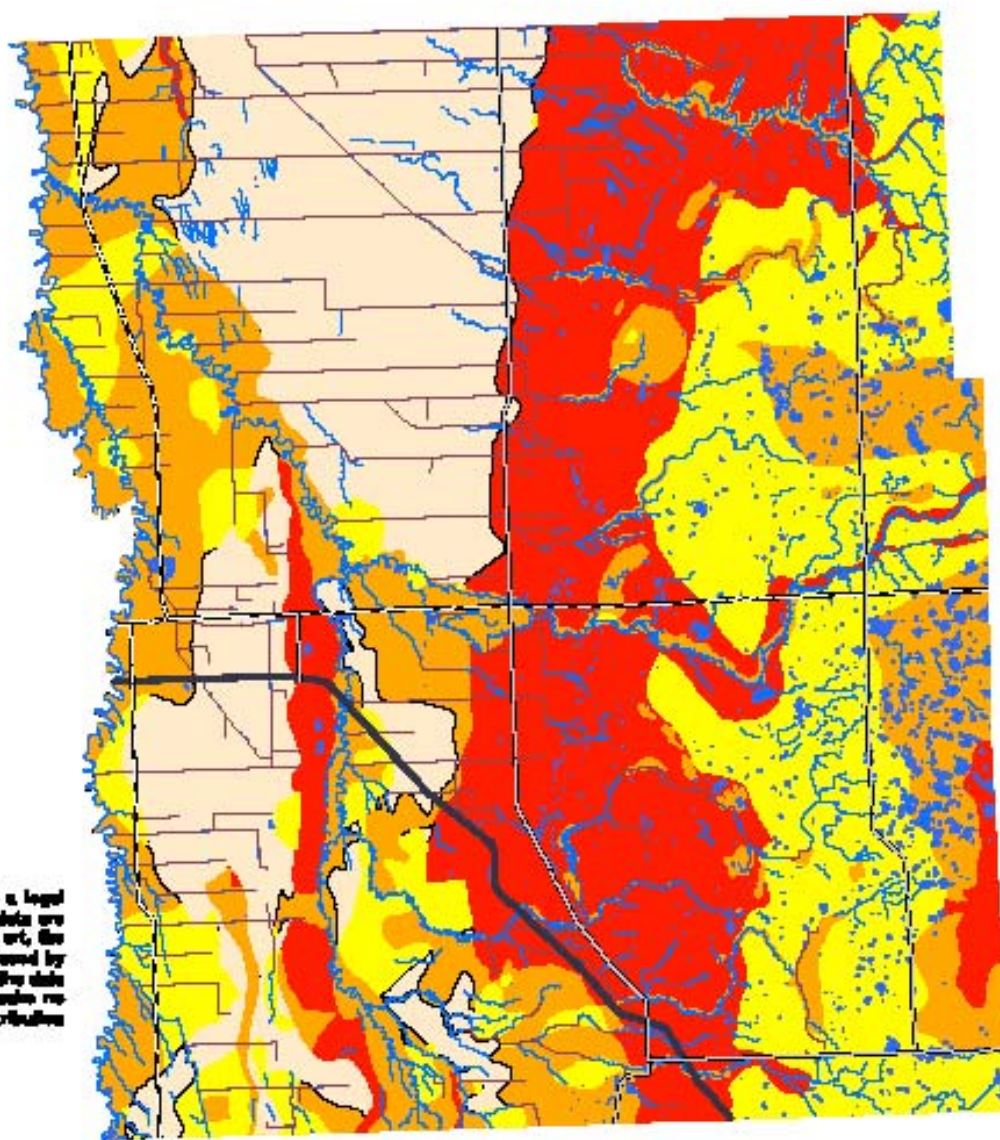


# GROUNDWATER SENSITIVITY TO CONTAMINATION



**Data Sources:**  
 Contamination Sensitivity, MNDNR/MGS  
 Highways, MNDOT  
 Ditches, MNDOT  
 Streams & Lakes, MNDNR

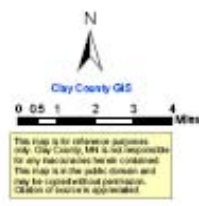
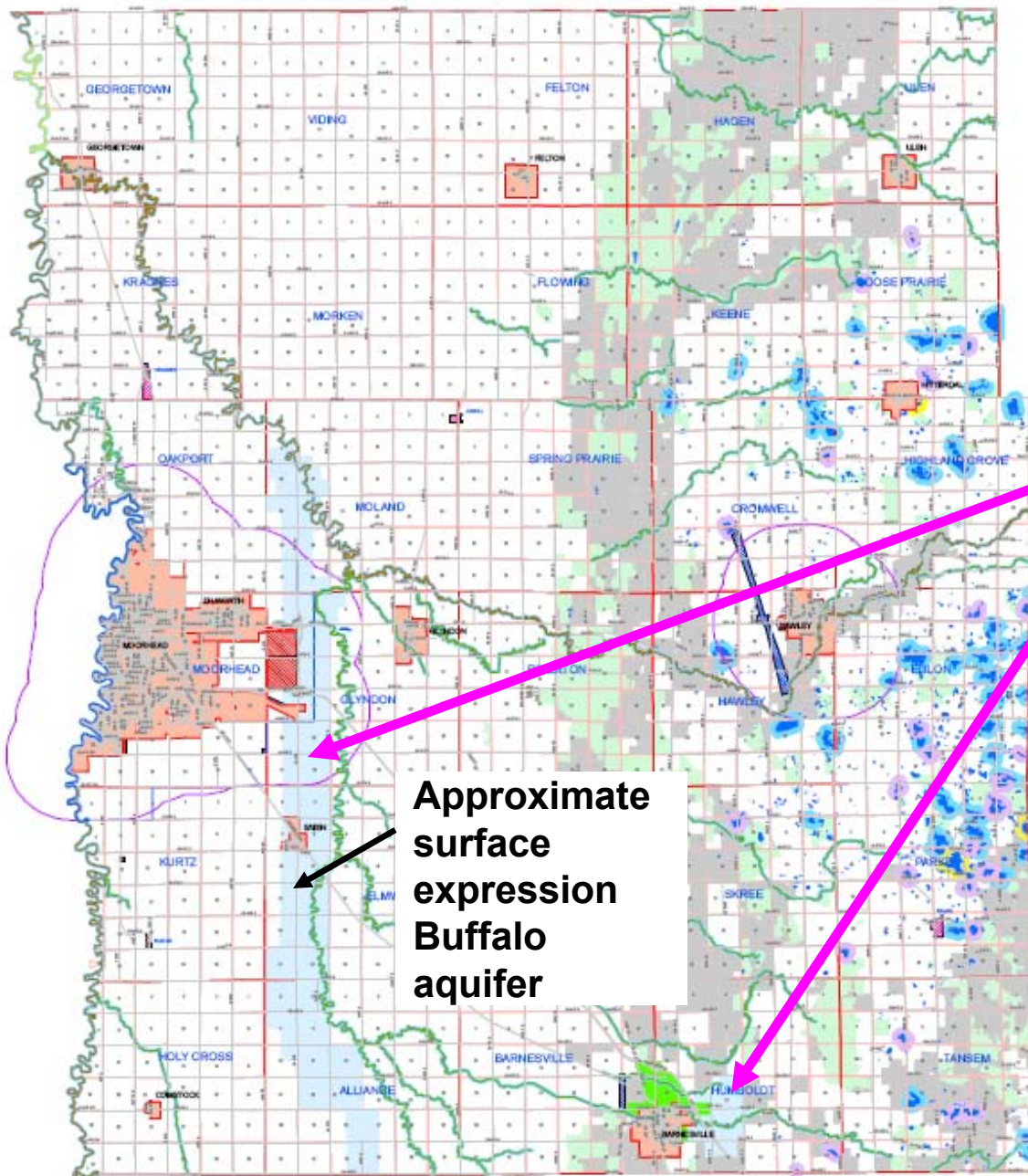
**Disclaimer:**  
 Maps are for graphical purposes only. They do not represent a legal survey. While every effort has been made to ensure that these data are accurate and reliable within the limits of the current state of the art, the MDCD and Clay SWCD cannot assume liability for any damages caused by any errors or omissions in the data, nor as a result of the failure of the data to function on a particular system. The MDCD and Clay SWCD make no warranties, expressed or implied, nor does the fact of distribution constitute such warranties."





# Clay County Zoning Map

Resource protection overlay district for wellhead protection





# **Clay County**

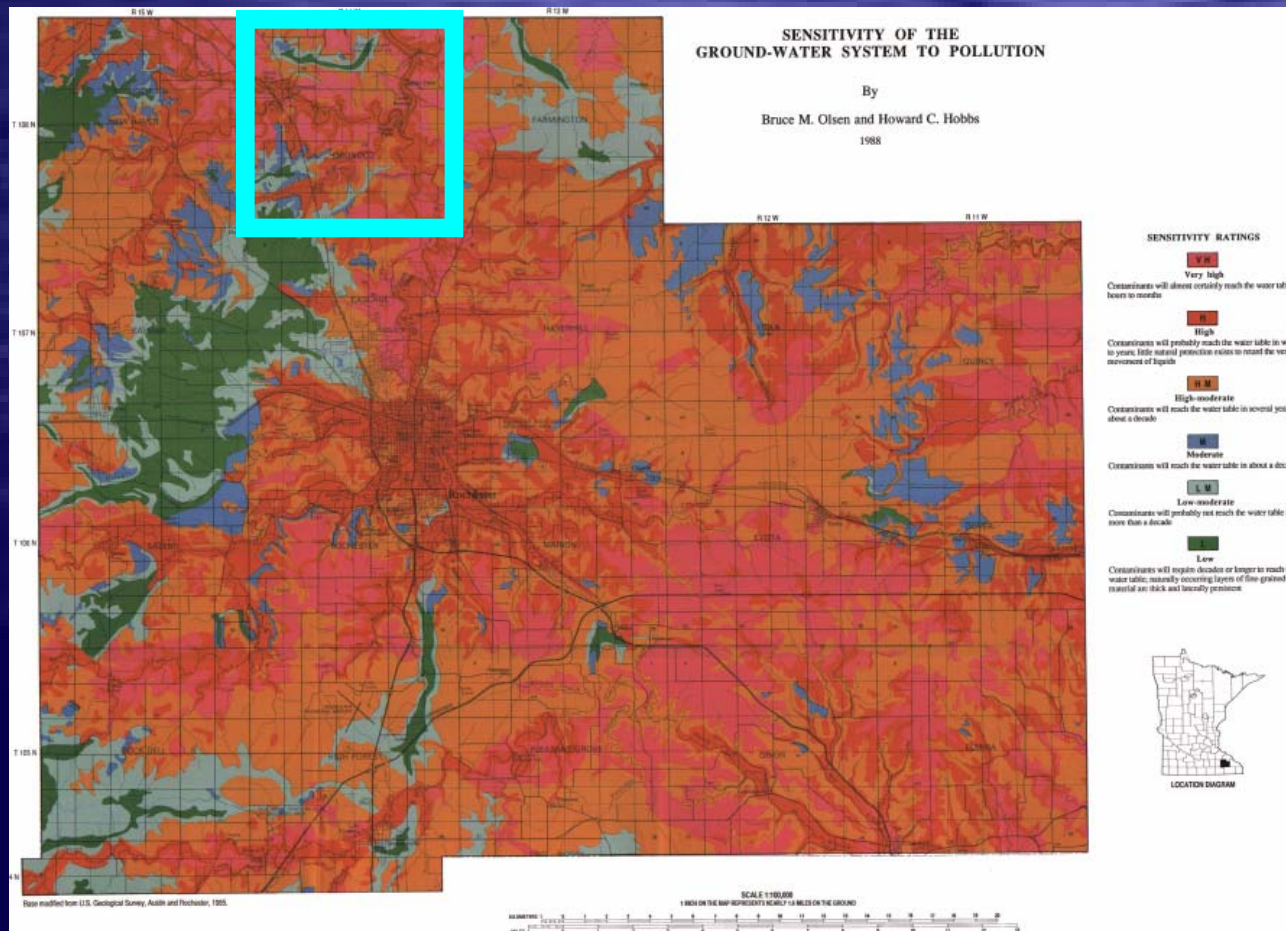
## **Resource Protection Overlay District**

### ***--wellhead protection--***

- **No cluster subdivisions or major subdivisions  
—maximum density standards**
- **Storm water management**
- **Phosphorus use limited**
- **Commercial uses must connect to public water  
and sewer**
- **No expansion of aggregate mining, setback and  
runoff control required for development near  
mines**
- **Spill containment for above-ground tanks**
- **No underground tanks**
- **No hazardous material storage**



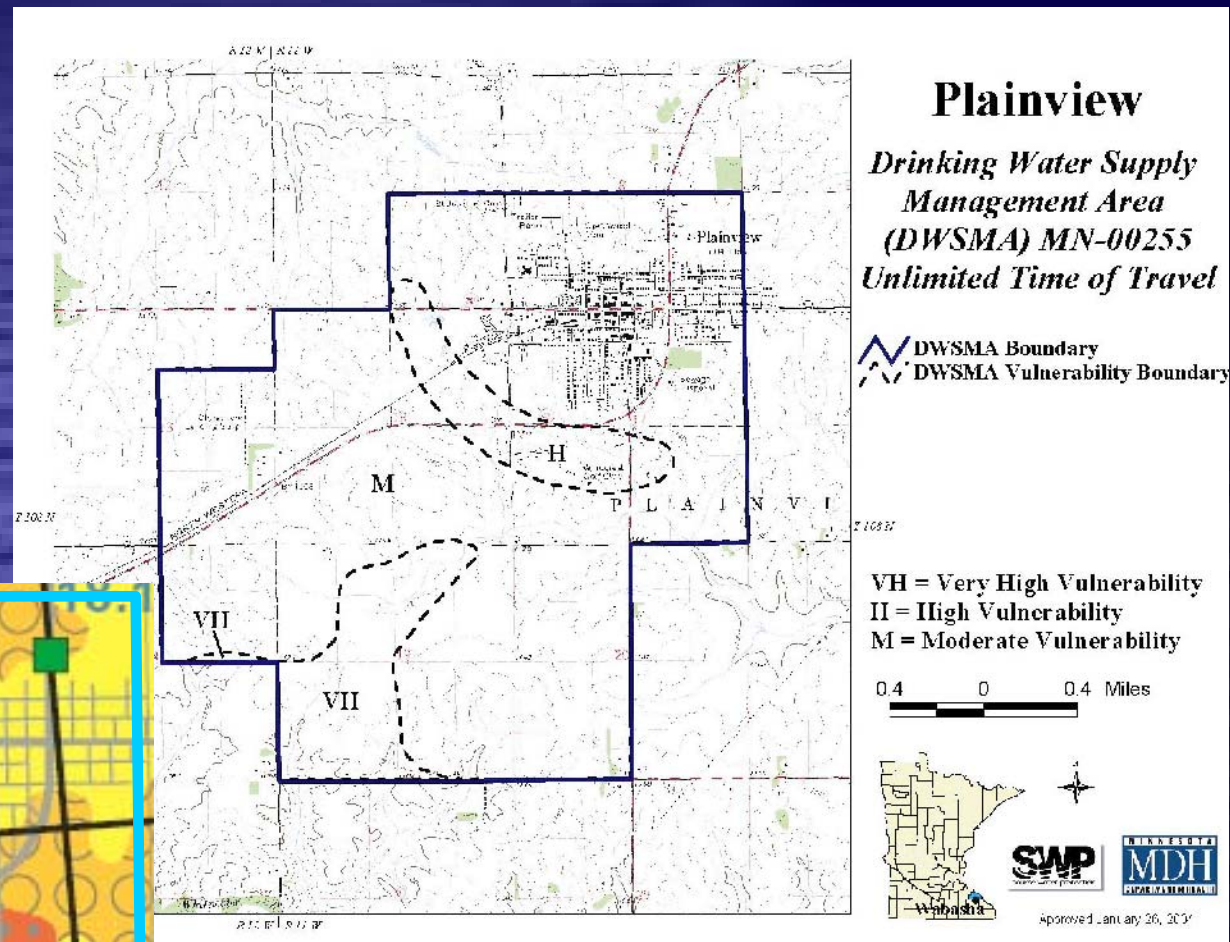
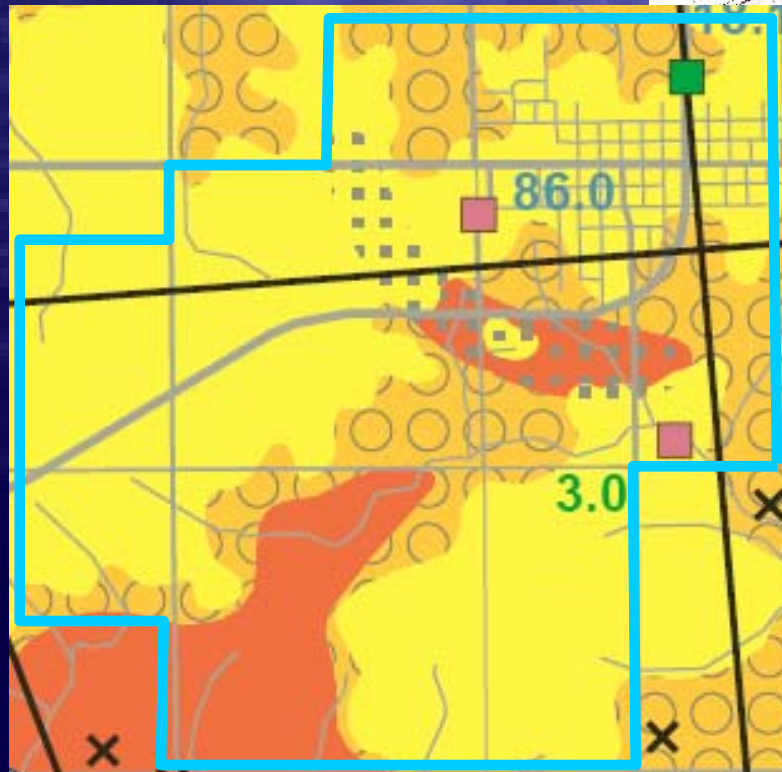
# Olmsted County and Ononoco Township



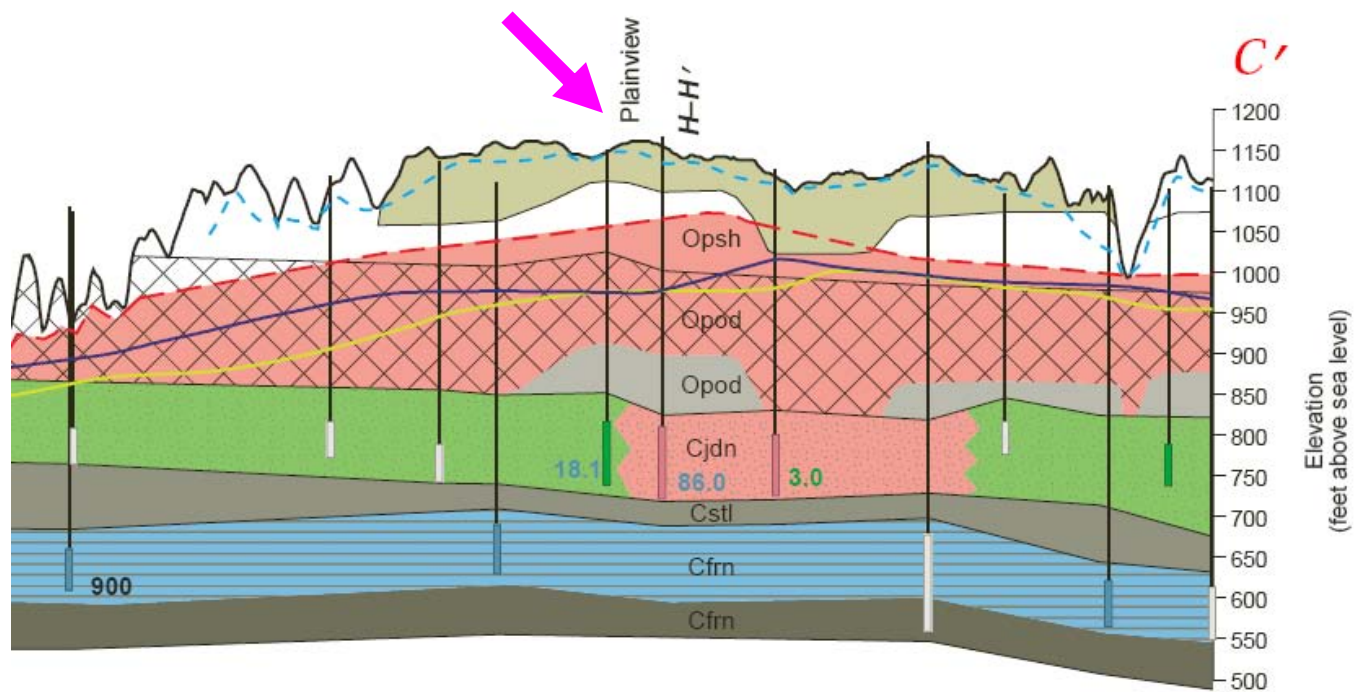
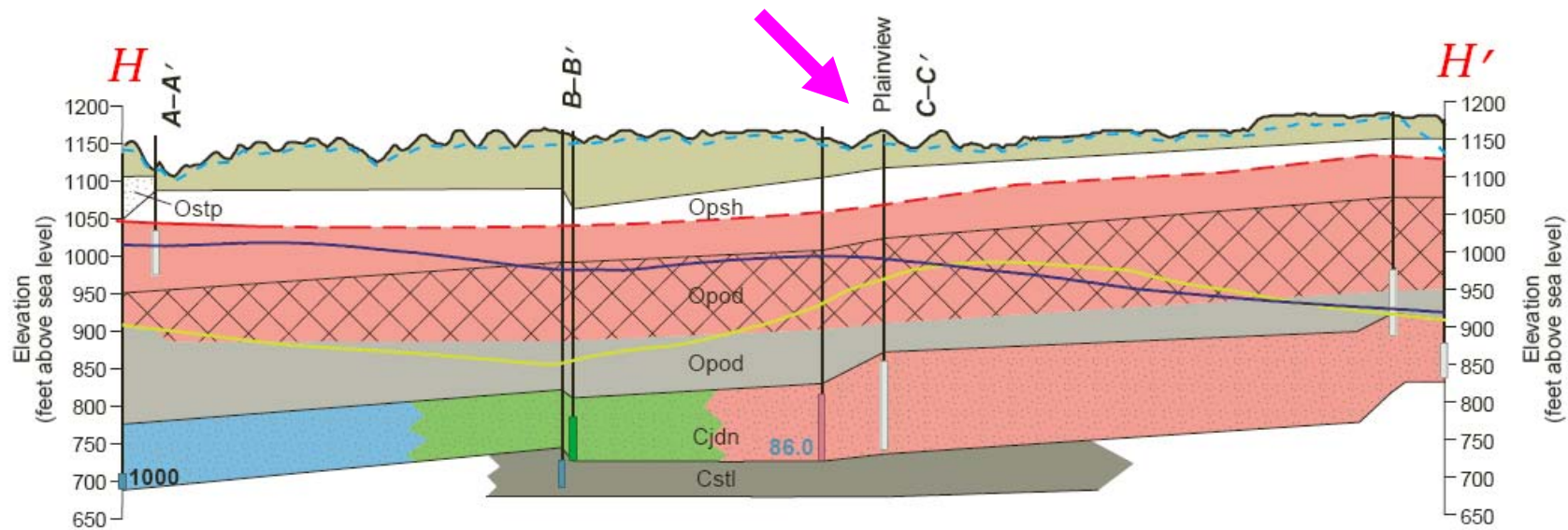
...“landfills of any type shall be located in the most geologically insensitive areas possible.”

# Wabasha County

Development of  
wellhead and source  
water protection plans







Northwestern

Northern

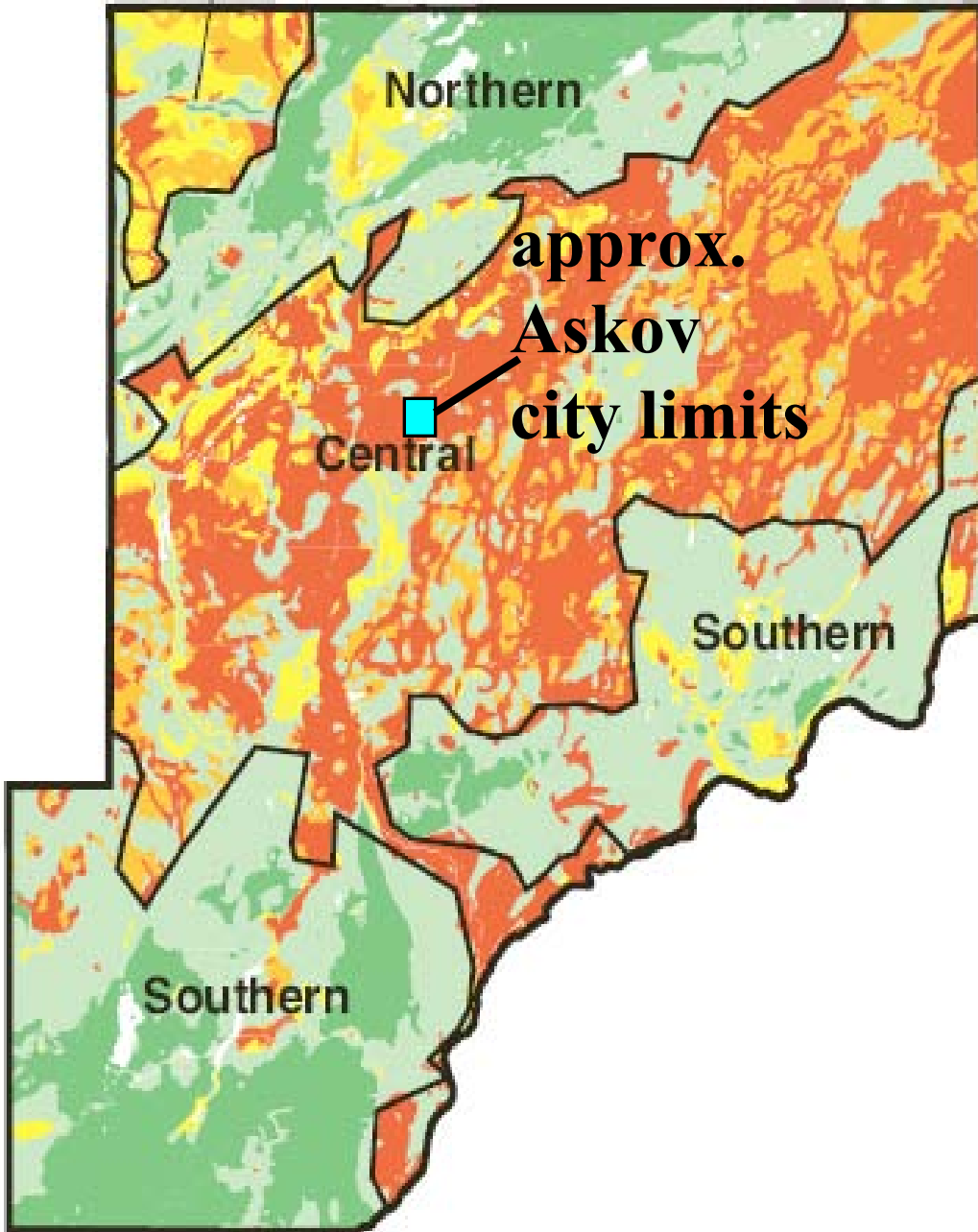
approx.  
Askov  
city limits

Central

Southern

Southern

# Pine County general sensitivity areas





# City of Askov Wastewater treatment ponds



Background image source:  
Brad Nordberg, MPCA



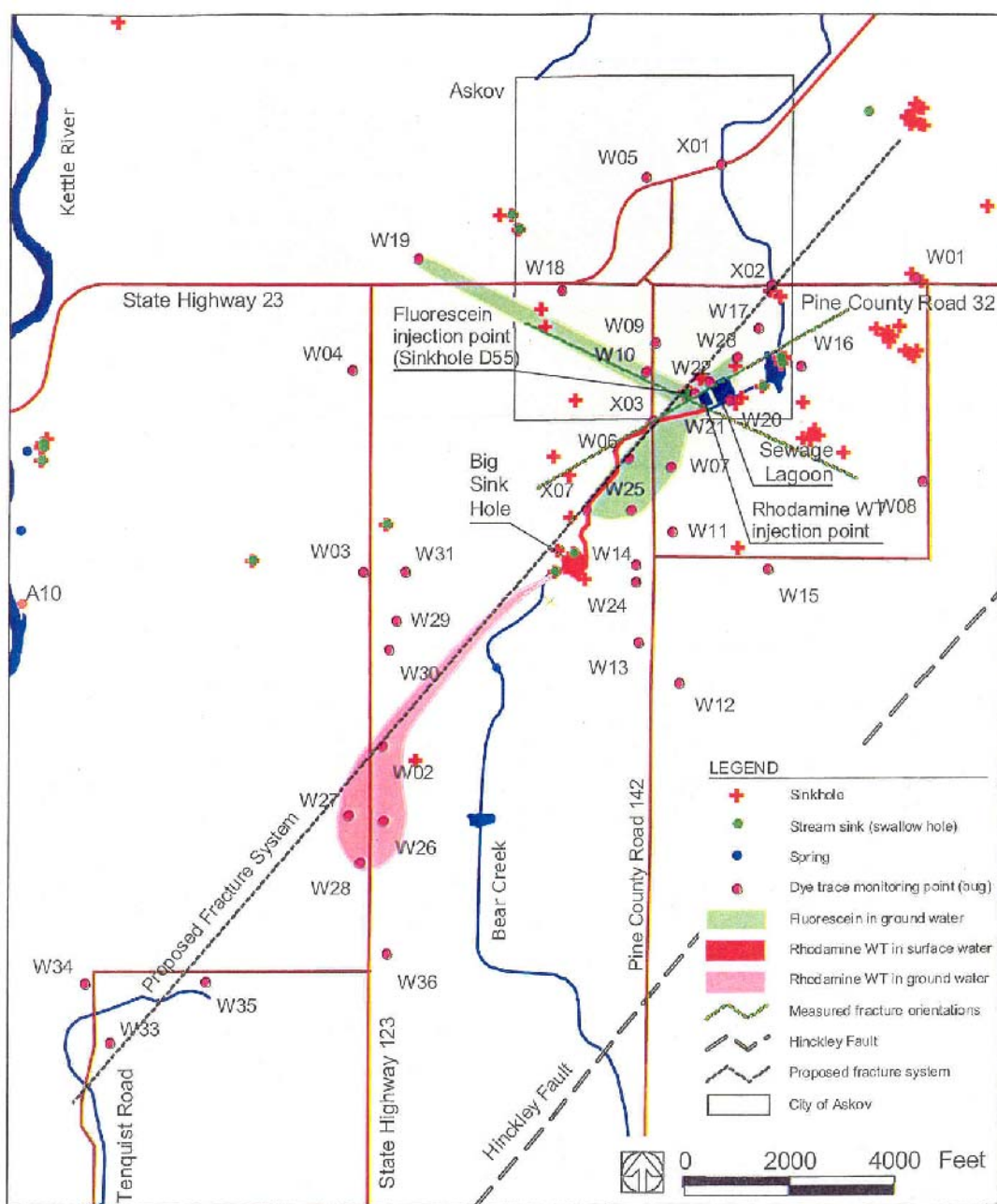
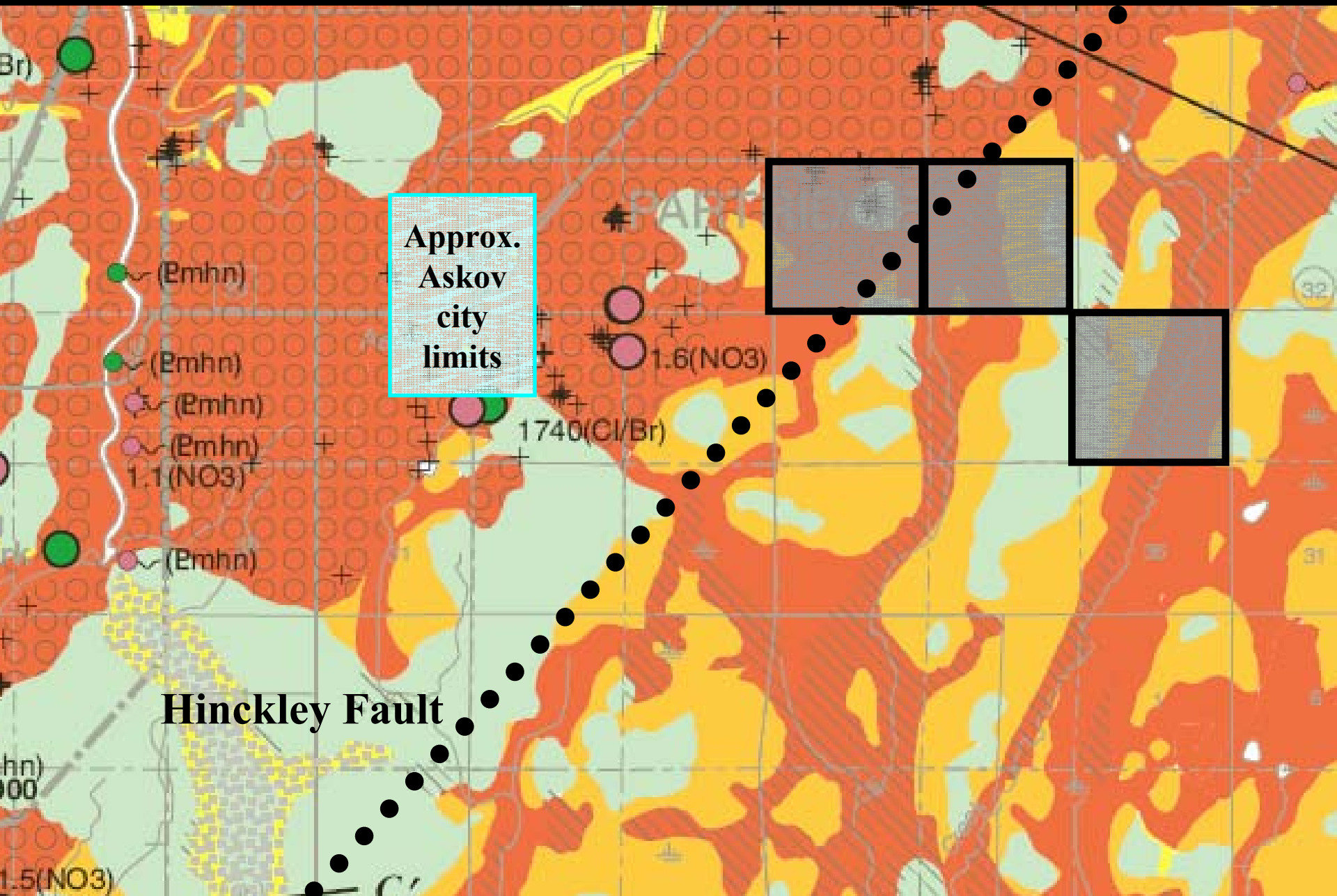
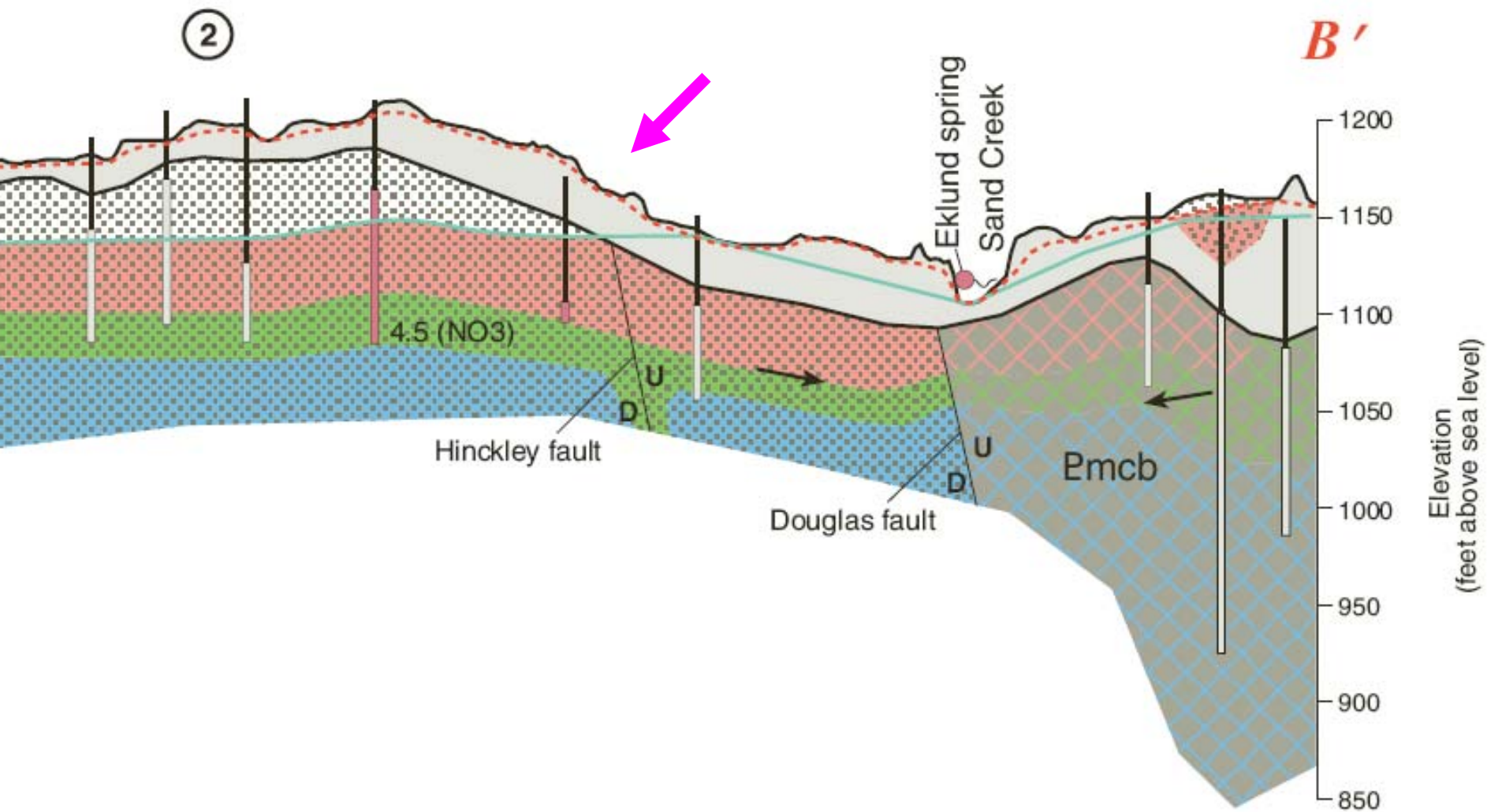


Figure 16: Relationship of karst features, dye detection, and structural trend of the Hinckley Fault. The proposed fracture system is drawn through W02 and parallel to the Hinckley Fault. The two principal fracture orientations measured by Boerboom (2002) are drawn through the fluorescein injection point.



Approx.  
Askov  
city  
limits

Hinckley Fault





**For more information**

[www.dnr.state.mn.us/waters](http://www.dnr.state.mn.us/waters)

[www.geo.umn.edu/mgs](http://www.geo.umn.edu/mgs)

