

Identification of vulnerability  
coverages and associated data  
range categories for use in water-  
resource vulnerability mapping of  
the Texas Hill Country

- Vulnerability mapping for the Hill Country is based on the DRASTIC vulnerability mapping as defined by the US Environmental Protection Agency. Their documentation for the model is online at <https://yosemite.epa.gov/water/owrccatalog.nsf/065ca07e299b464685256ce50075c11a/9f6b7f250b4fbc4585256b0600723559!OpenDocument>

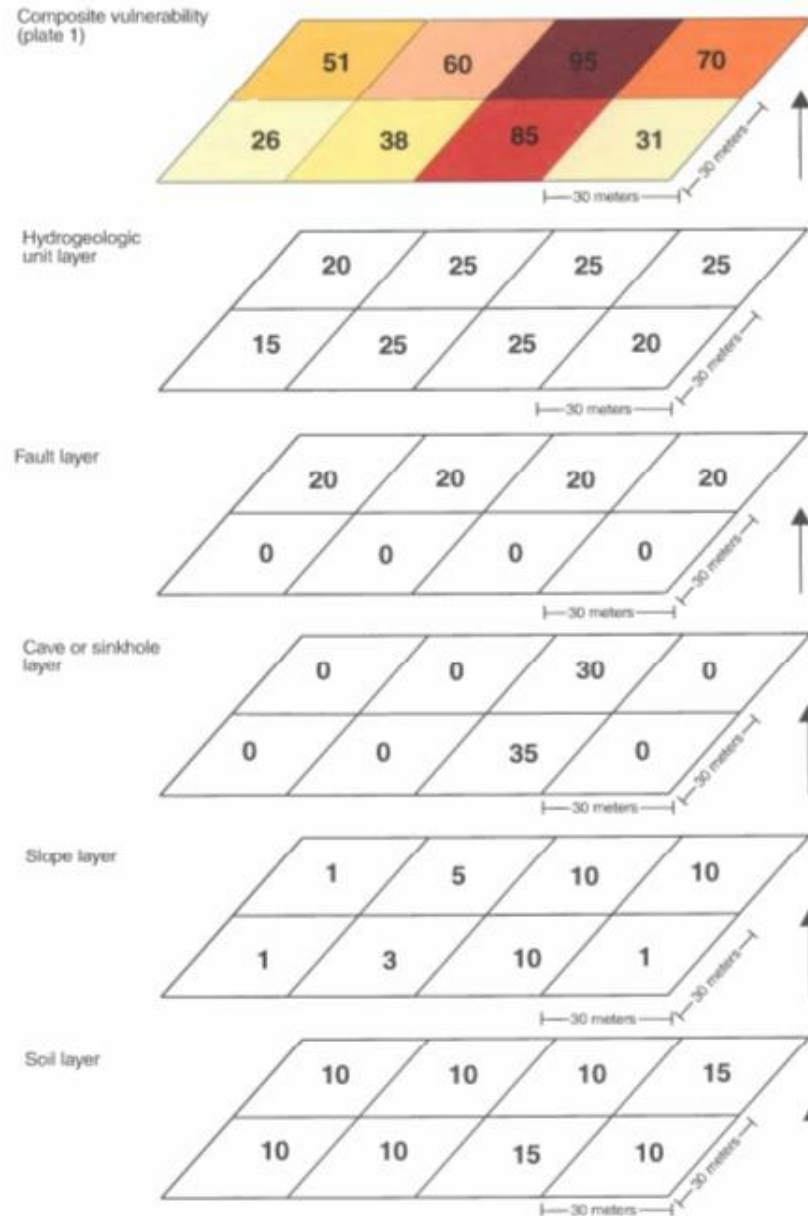
A DRASTIC type model was developed for the Edwards aquifer in Bexar County by the U.S. Geological Survey. The report of this product is online at

<http://pubs.usgs.gov/wri/2000/4149/report.pdf>



# DRASTIC PARAMETERS

- ⇒ D- Depth to Water
- ⇒ R- Recharge
- ⇒ A- Aquifer Media
- ⇒ S- Soils
- ⇒ T- Topography
- ⇒ I- Impact of Vadose Zone
- ⇒ C- Hydraulic Conductivity



**Figure 3.** An example of how vulnerability ratings for the hydrogeologic units and other natural features relate to composite ratings (modified from A.K. Clark, 2000).

# DRASTIC INDEX

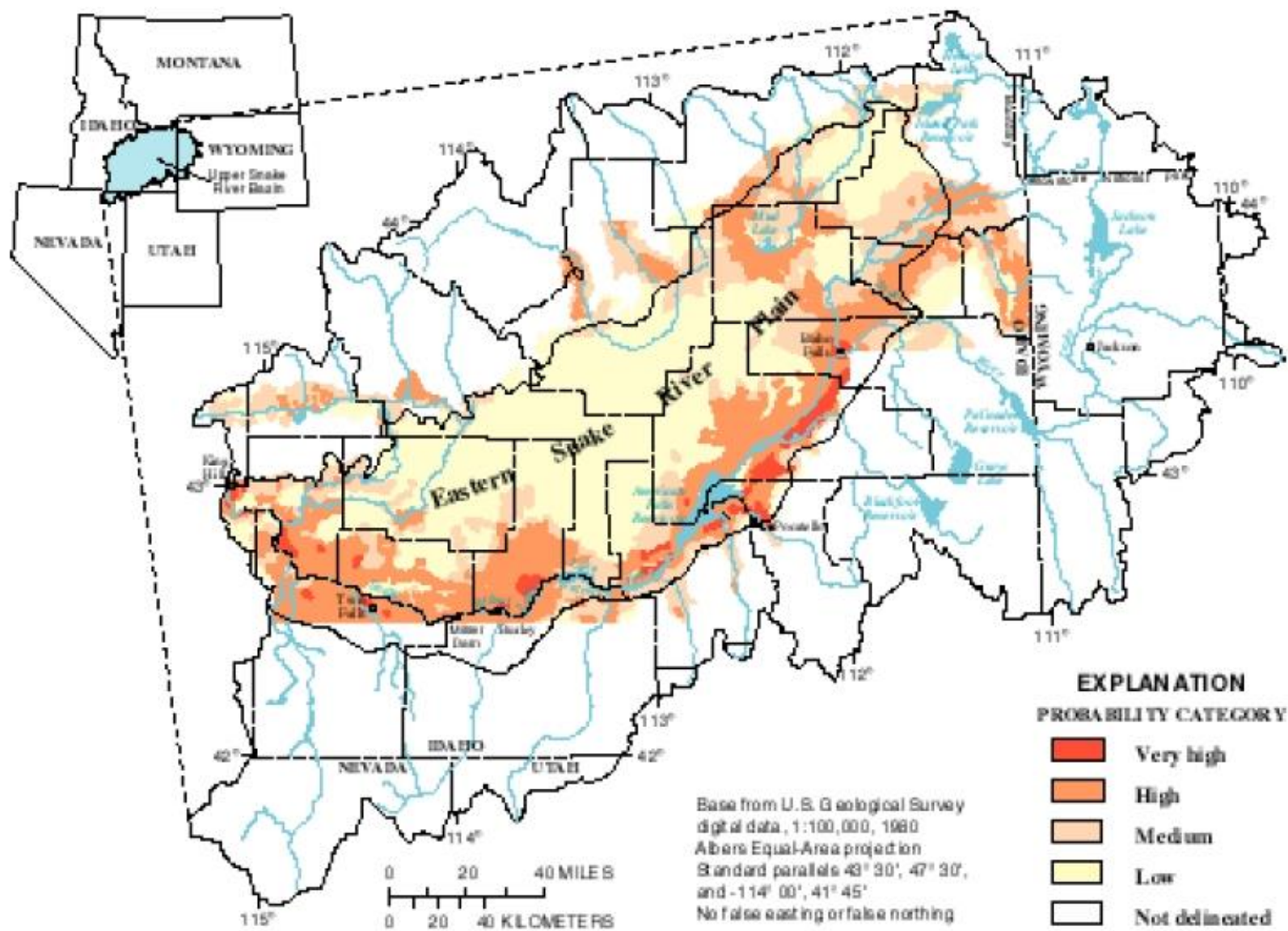
⇒ Higher the Value, greater vulnerability

Drastic Index =

$$\frac{D_r}{D_w} + \frac{R_r}{R_w} + \frac{A_r}{A_w} + \frac{S_r}{S_w} + \frac{T_r}{T_w} + \frac{I_r}{I_w} + \frac{C_r}{C_w}$$

Where  $w$  = weight

$r$  = rank



**Figure 1.** Probability of ground-water contamination by dissolved nitrite plus nitrate as nitrogen, eastern Snake River Plain, Idaho.



# Existing coverages

## ▼ HCA

### ▼ Hydrology

- ▶  Dams
- ▶  Rivers
- ▶  Large Streams
- ▶  All Streams
- ▶  Reservoirs
- ▶  Springs
- ▶  FEMA Flood Zones

### ▼ Environmental

- ▶  Endangered Species Critical Habitat
- ▶  Cavities per sqkm

### ▶ Water Management

### ▼ Hydrologic Data

- ▶  Gain-loss Flow Study
- ▶  Streamflow Studies
- ▶  USGS Streamflow Data Stations
- ▶  Wastewater Outfalls
- ▶  TWBD Water Wells

### ▼ Aquifers

- ▶  Edwards Aquifer
- ▶  Major Aquifer
- ▶  Minor Aquifer

### ▼ Conservation

- ▶  Parks
- ▶  Federal Lands

### ▼ Hazardous Waste Sites

- ▶  Permanent Industrial Hazardous Waste Sites
- ▶  Radioactive Waste Sites
- ▶  Superfund Sites

### ▶ Transportation

### ▶ Proposed Transportation Projects

### ▶ Municipal

### ▶ Extraterritorial Jurisdictions

### ▶ Sewer and Water

### ▶ Subdivisions

### ▼ Physical Geography

- ▶  Geologic Faults
- ▶  Contours, all
- ▶  Contours, range
- ▶  Slope
- ▶  Soils - Percent Clay
- ▶  Soils - Depth in inches
- ▶  Soils - Ksat
- ▶  Vegetation

### ▶ HCA Counties

### ▶ Surrounding Counties



## Suggested Vulnerability coverages and associated value range categories

1. **Flood plains**--2 categories--in or out of 100 year flood plain
2. **Cave and cavity density**-- 1-5, 6-15, and 16-51 cavities per kilometer
3. **Land slope**-- suggested 4 slope categories -- green for **less than 2 %**; yellow for **2-4 %** orange for **5-9 %** and red for **greater than 10% ?**
4. **Soil thickness** --aggregated into 5 categories: **NA, <20, 21-40, 41-60, >60 inches**
5. **Vegetation characteristics** -- vegetation type currently presented  
Can we develop a characteristic for vegetation that would be relative to vulnerability (i.e., **vegetated ground cover as percent**)?
6. **Buffer zone**-- not an existing coverage but probably could be calculated as distance from 1st to 3rd (or maybe 4th) order stream channels? Maybe should be shown as 5 categories: **<50, 51-100, 101-150, 151-200, and >200 feet** from any 1st, 2nd, or 3rd (or 4th?) order stream.
7. **Faults** -- linear features not 2 dimensional as are other coverage areas. Create fault density per area?