

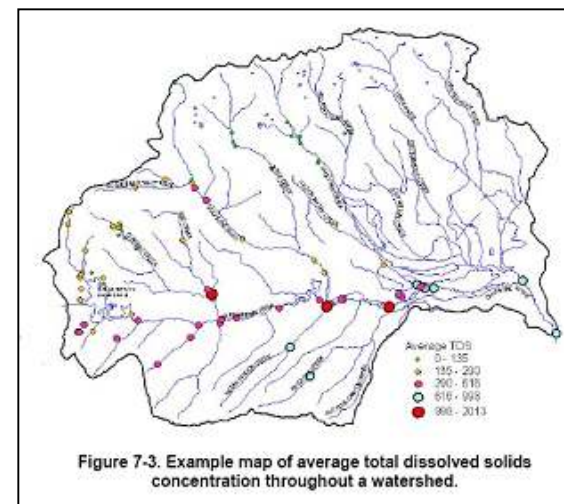
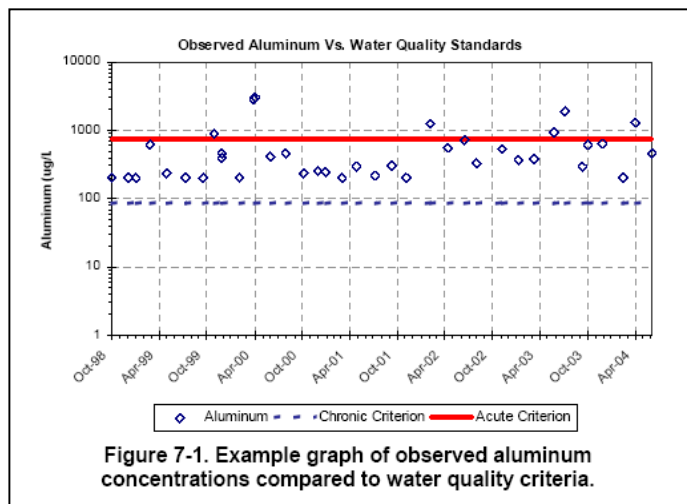
# Interpreting and Using Existing Data to Identify Pollution Causes and Sources



# Confirm impairments and identify pollutants

Compare available monitoring data to wqs:

- Document magnitude of impairment
- Document seasonal/temporal patterns
- Document spatial distribution



# Spatial Analysis

- Isolate critical subwatersheds
- Combine with land use/land cover data

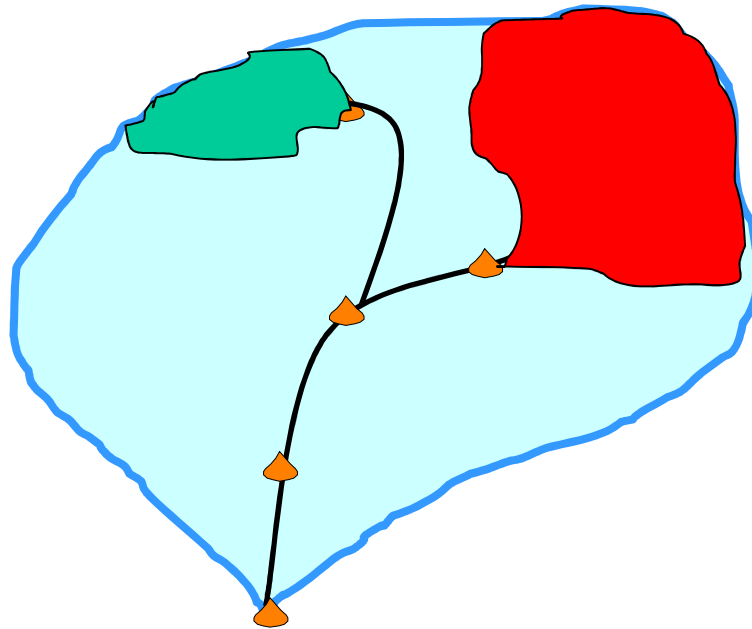
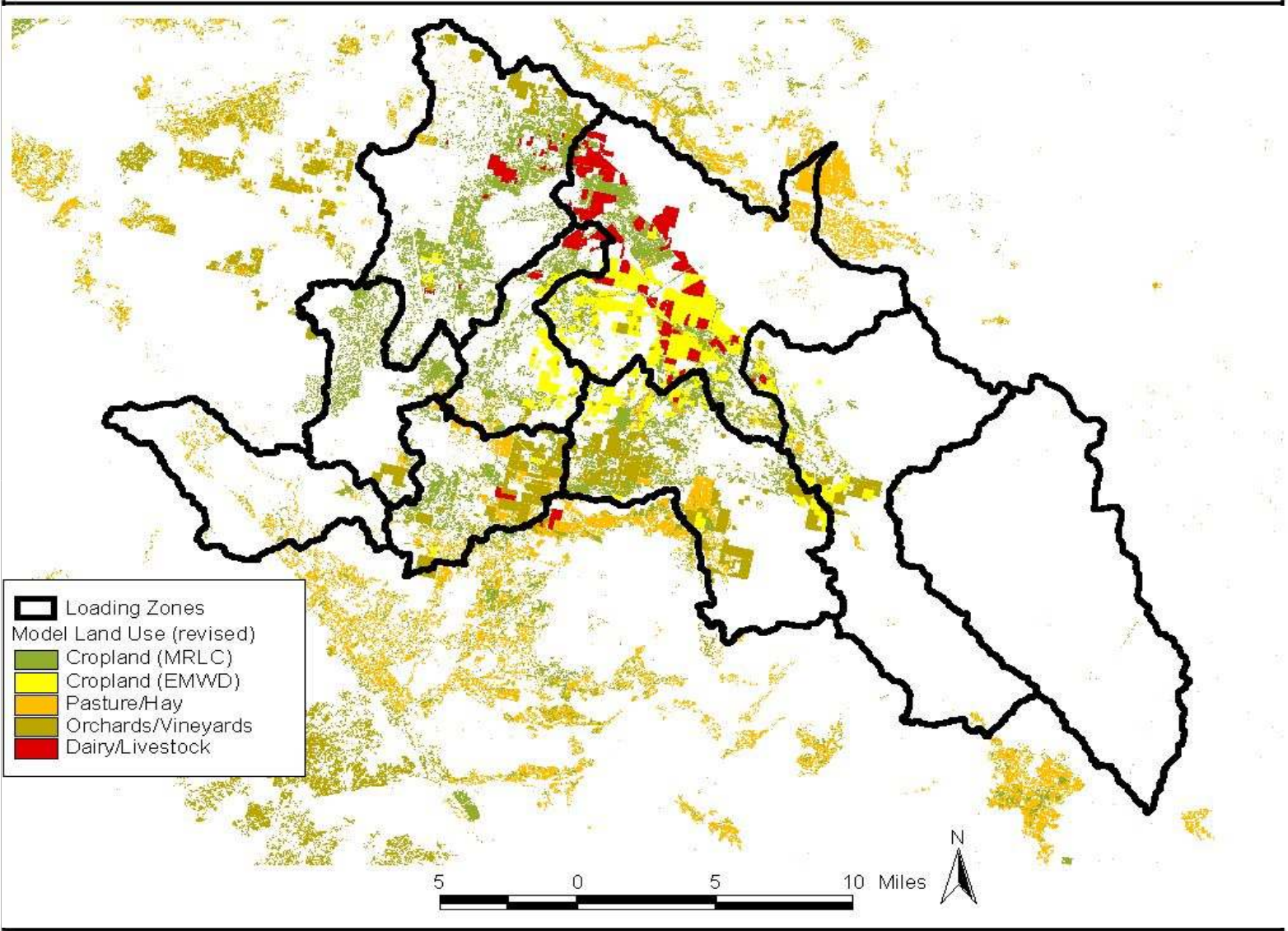


Table 9. Unit loads of pollutants (kg/ha/yr) from different land uses\*

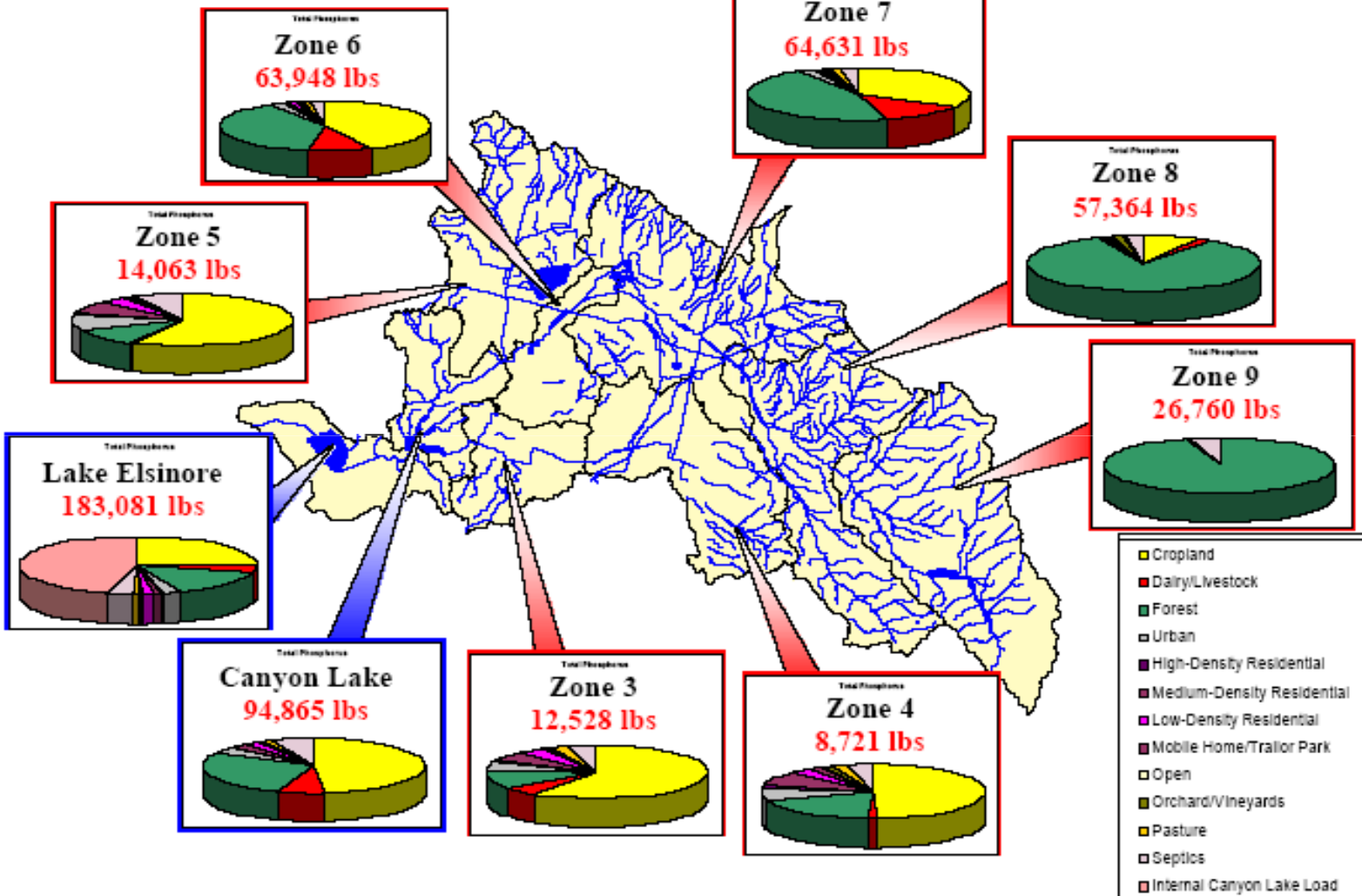
Pollutant	Central business district	Other commercial	Industrial	Single family res.	Multi-family res.	Cropland	Pasture	Forest	Open
TSS	1080	840	56	17	440	450	340	85	7
COD	1070	1020	63	28	330	n.a.	n.a.	n.a.	2.0
Pb	7.1	3.0	2.0 - 7.1	0.1	0.7	0.005 - 0.006	0.003 - 0.015	0.01 - 0.03	n.a.
Zn	3.0	3.3	3.5 - 12	0.22	0.33	0.03 - 0.08	0.02 - 0.17	0.01 - 0.03	n.a.
Cu	2.1	n.a.	0.33 - 1.1	0.03	0.33	0.01 - 0.06	0.02 - 0.04	0.02 - 0.03	n.a.
NO <sub>3</sub> +NO <sub>2</sub> -N	4.5	0.67	0.45	0.33	3.8	7.9	0.33	0.56	0.33
TKN	15	15	2.2 - 15	1.1 - 5.6	3.4 - 4.5	1.7	0.67	2.9	1.7
TP	2.8	2.7	0.9 - 4.0	0.2 - 1.5	1.3 - 1.6	0.1 - 3.0	0.07 - 3.0	0.02 - 0.45	0.06

\* Exact values are given where available; otherwise ranges are reported.

*Adapted from Horner et al. (1986)*

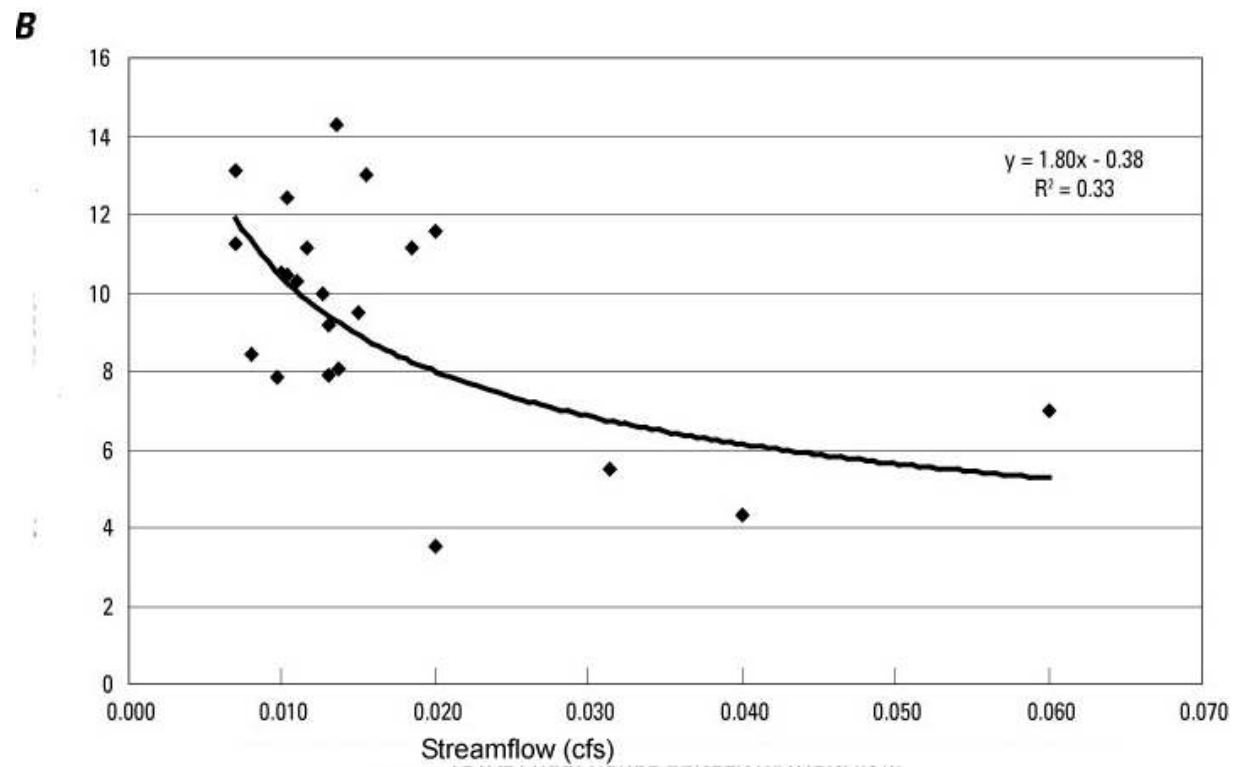


# 1998 Total Phosphorus Loads (Wet Year)



# Flow Relationships

- Point vs. Nonpoint



# Flow Relationships

- Point vs. Nonpoint

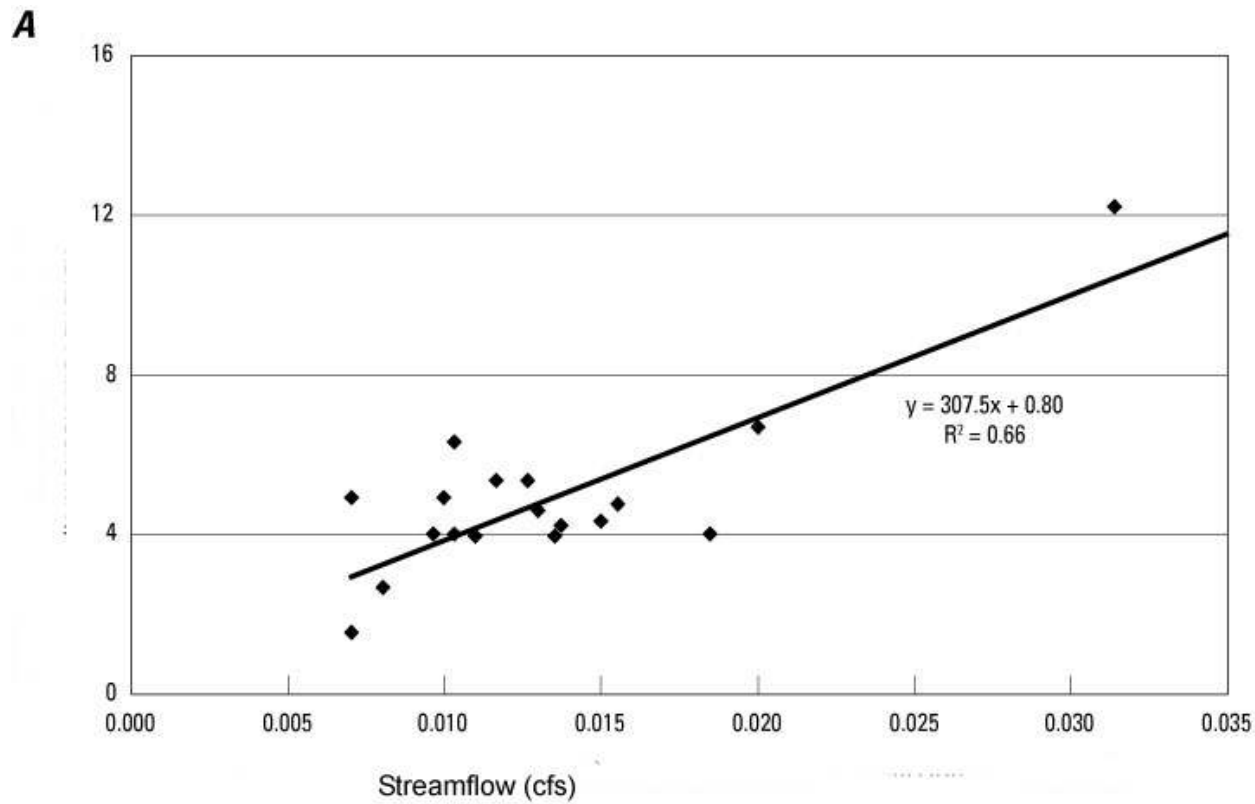
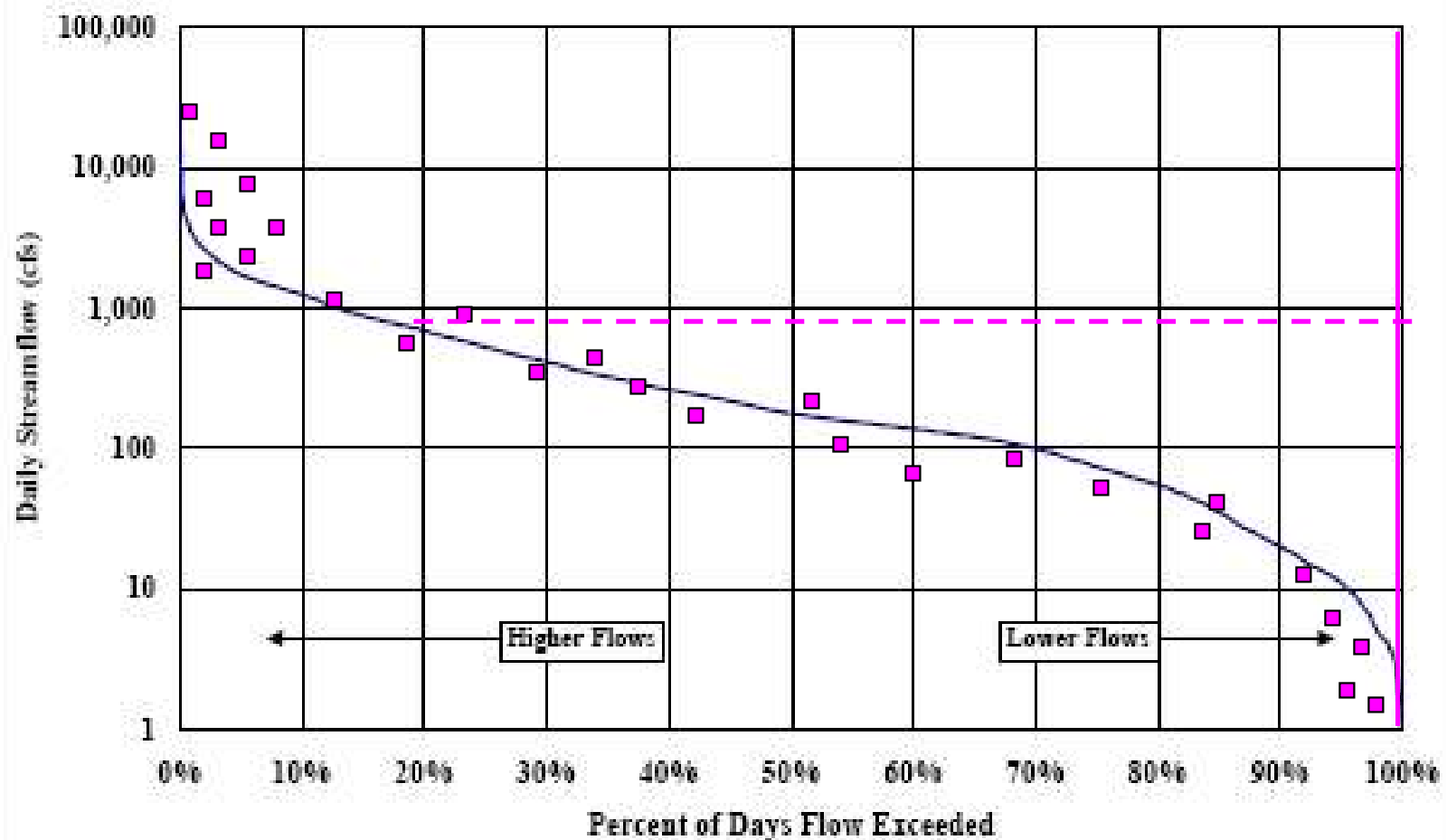


Figure 1. Flow Duration Curve - Sta. 10311000 Carson River near Carson City, NV (Water Years 1982-2001)



# Temporal Analysis

- Seasonality
- Stratify data by potential source activities
  - Tillage
  - Crop canopy development
  - Manure/fertilizer applications
  - Grazing season
  - Logging
  - Construction projects
  - Street cleaning



# Other tools:

- Stakeholder knowledge
- Direct observation (streamwalk)
- Specialized tools, e.g., microbial source tracking, ground water aging



# Supplementing available data

- Windshield surveys
- Interviews with residents
- Volunteer monitoring
- Bioassessment
- Targeted sampling
- Chemical/biological sampling

*Helps lay the groundwork for implementation!*



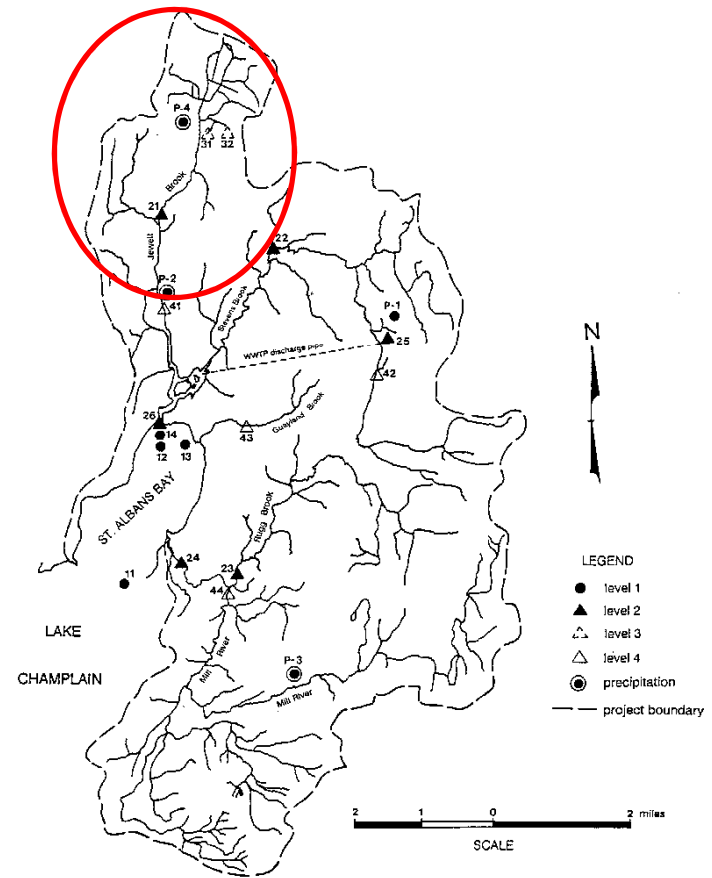
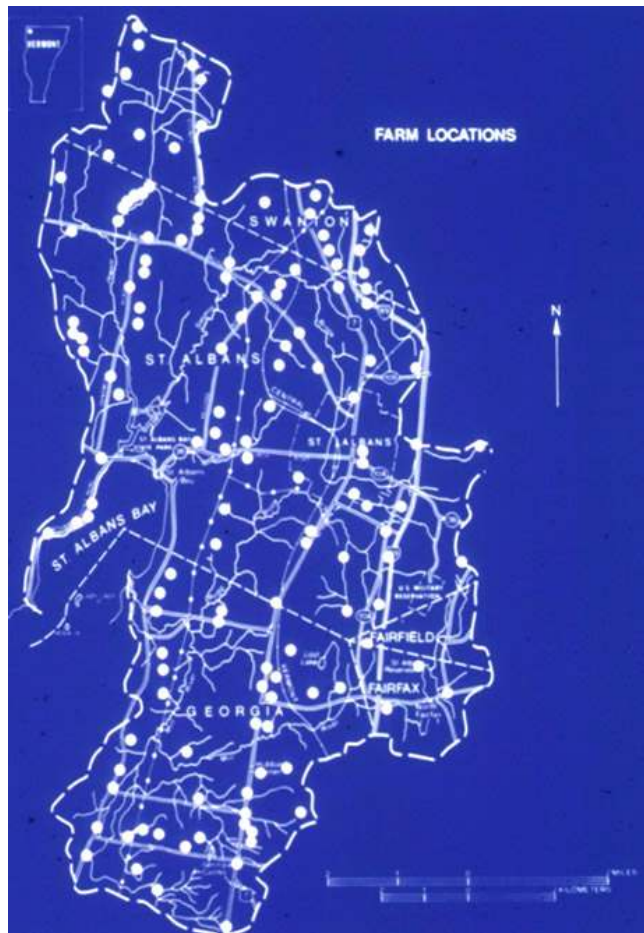
# Examples

# St. Albans Bay VT RCWP

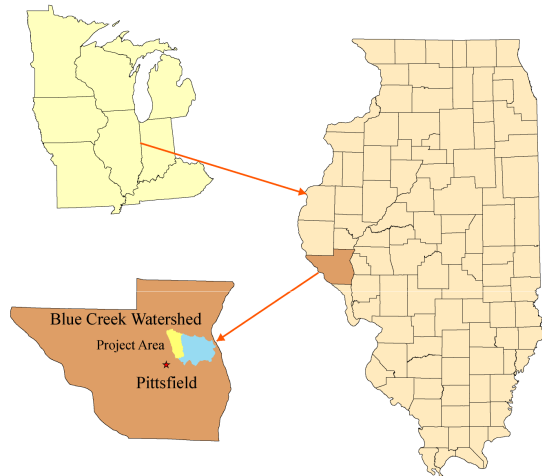
- Known WQ impairment due to eutrophication
  - Obvious algae blooms & macrophyte growth
  - Declining State Park visits, beach closures
  - State DEC P monitoring
    - Excessive P loads to Bay
    - 75% point source/25% nps
- NRCS knowledge about current status of animal waste management, milkhouse waste, cropland erosion



# St. Albans Bay VT RCWP

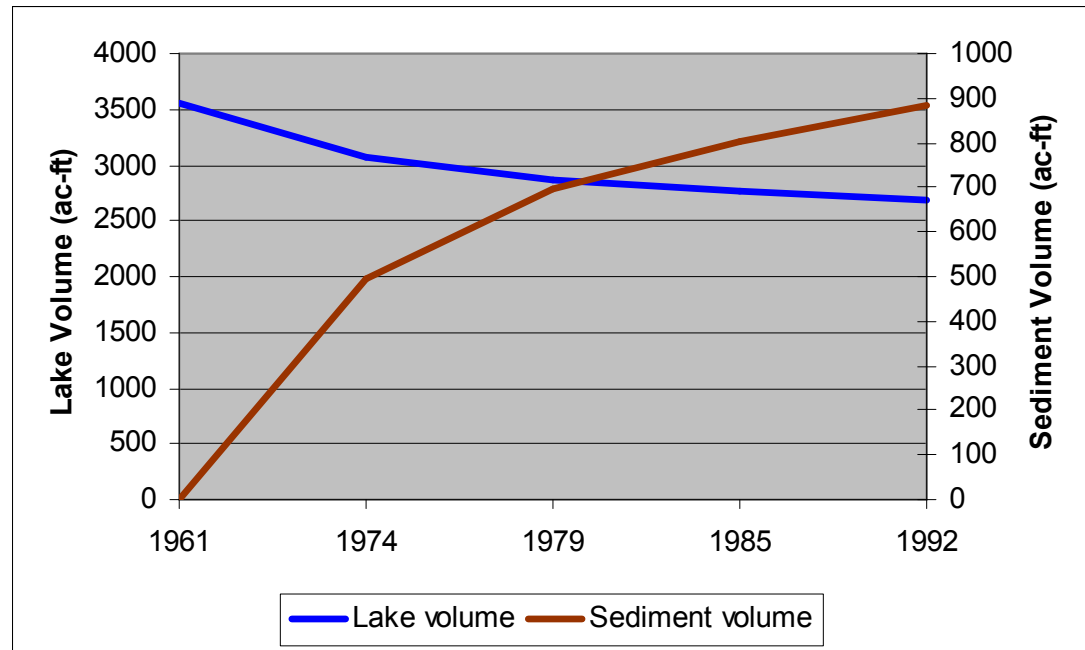
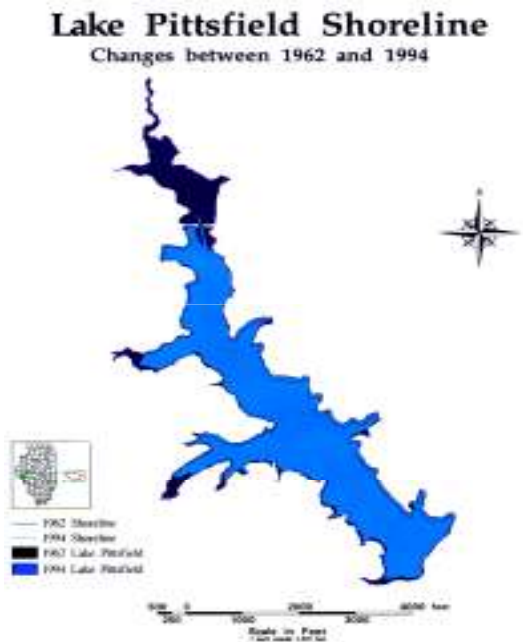


# Lake Pittsfield IL



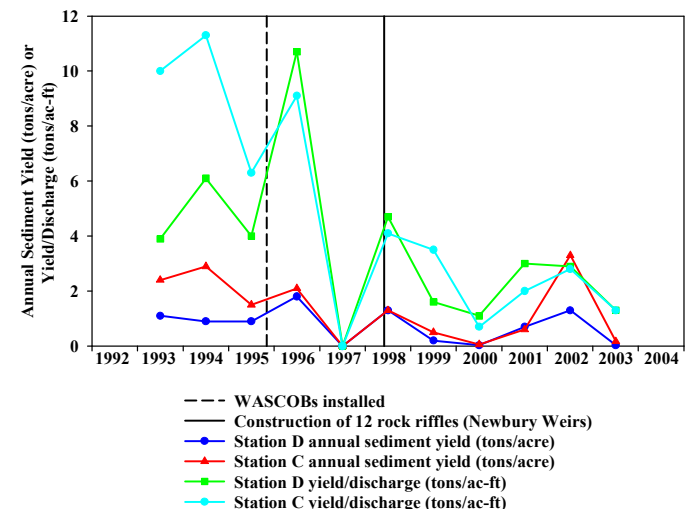
- Lake Pittsfield is a 220 ac lake located near the city of Pittsfield in the 25,393 ac Blue Creek watershed in Pike County, western Illinois
- Constructed in 1961 as a flood control reservoir.
- Sediment deposition the dominant water quality problem

# Lake Pittsfield IL

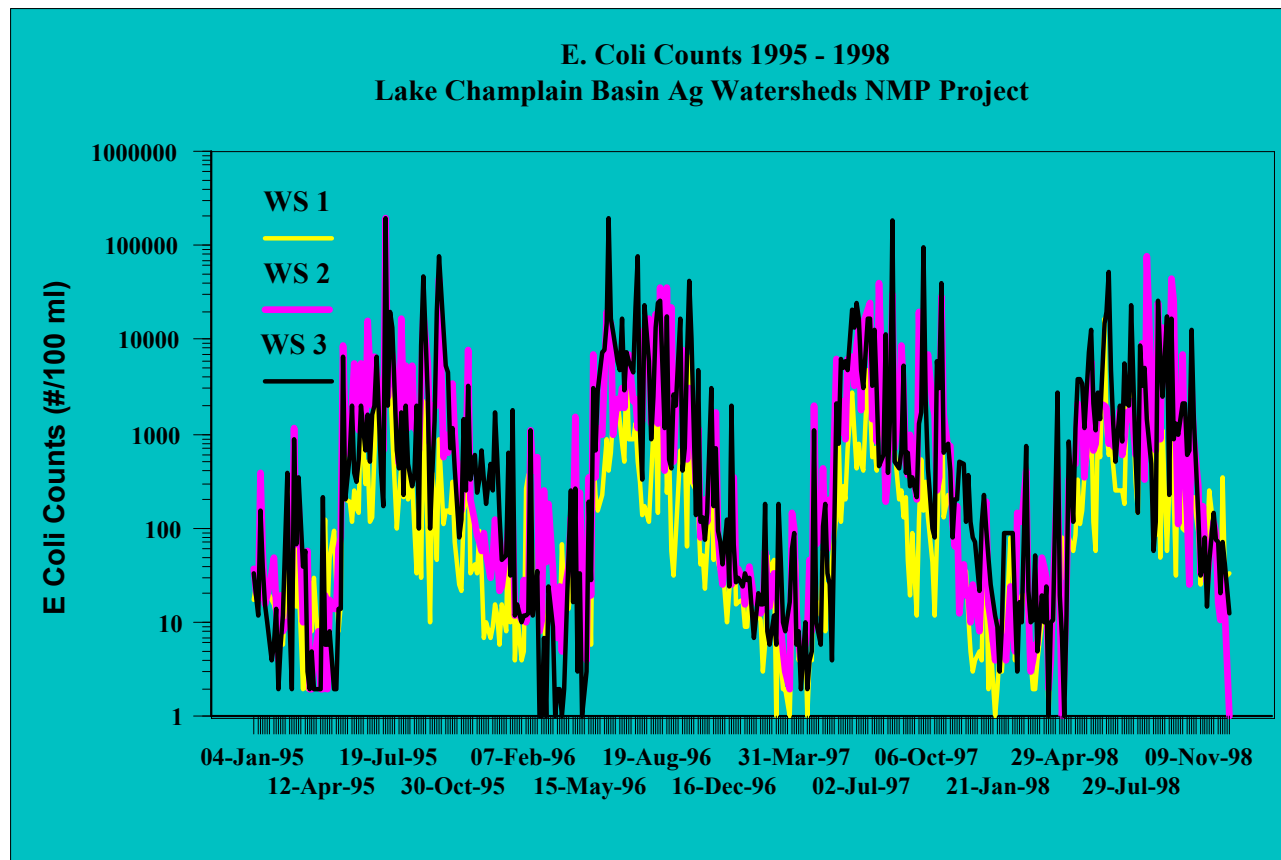


# Lake Pittsfield IL

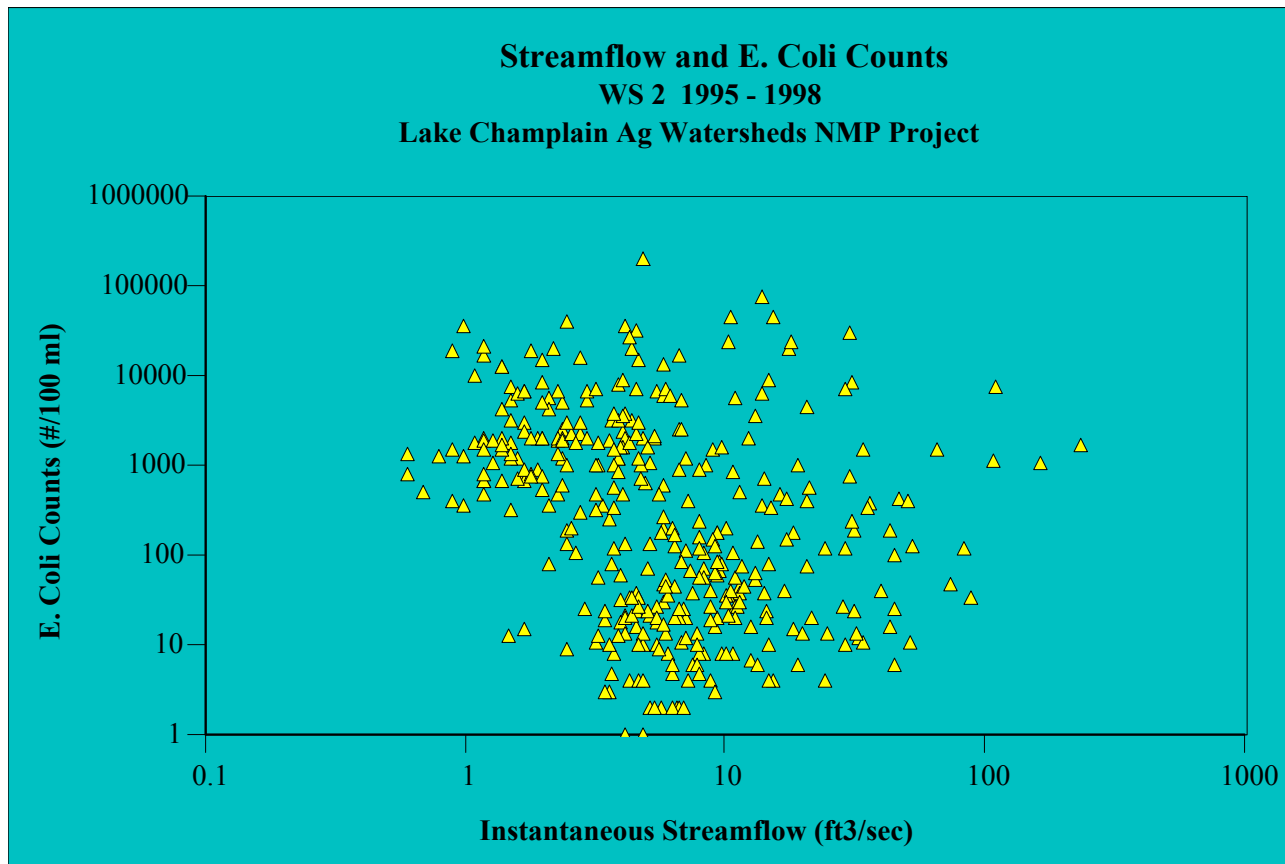
- 1979 vegetative practices on agricultural land slowed sedimentation rate
- Lake sedimentation still higher than desired
- Additional practices needed – WASCOBs and sediment retention basins



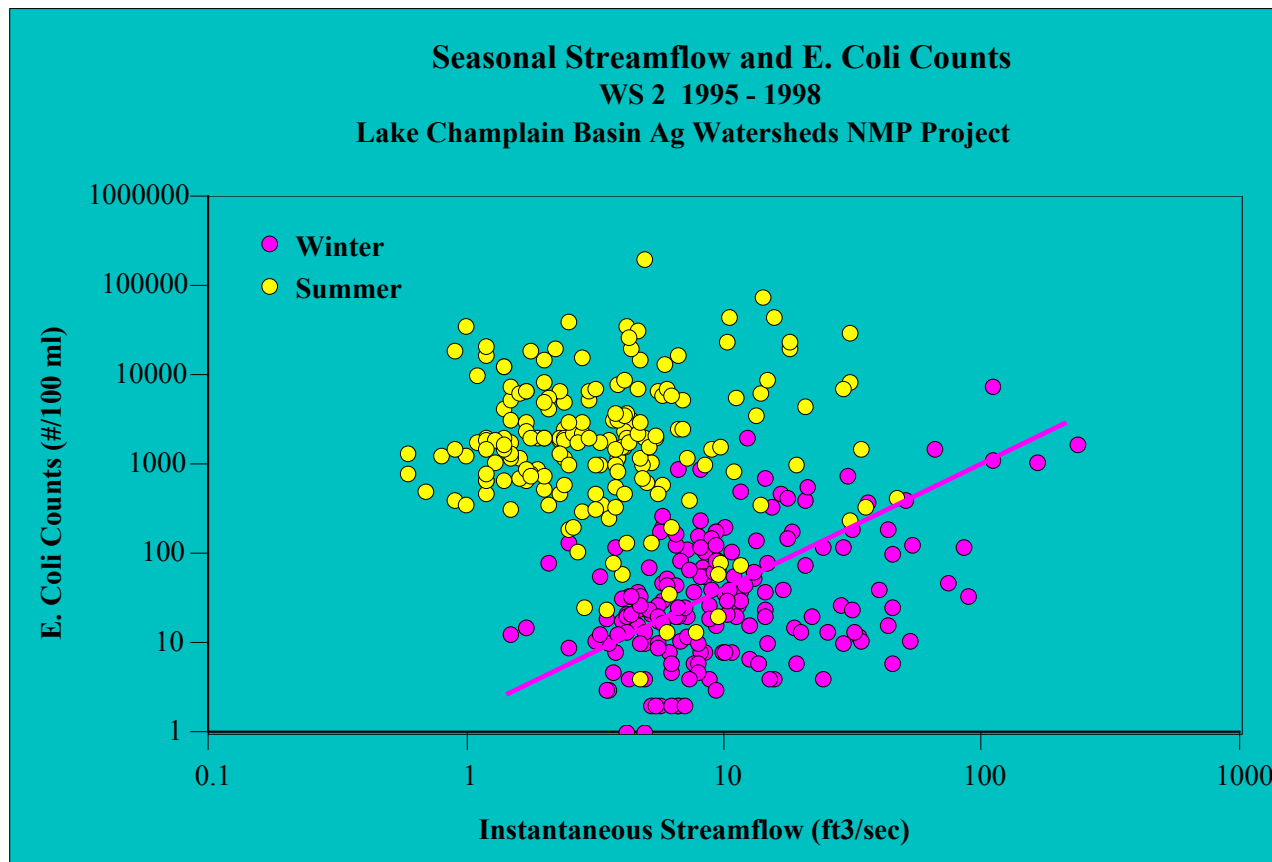
# VT 319 NMP



# VT 319 NMP



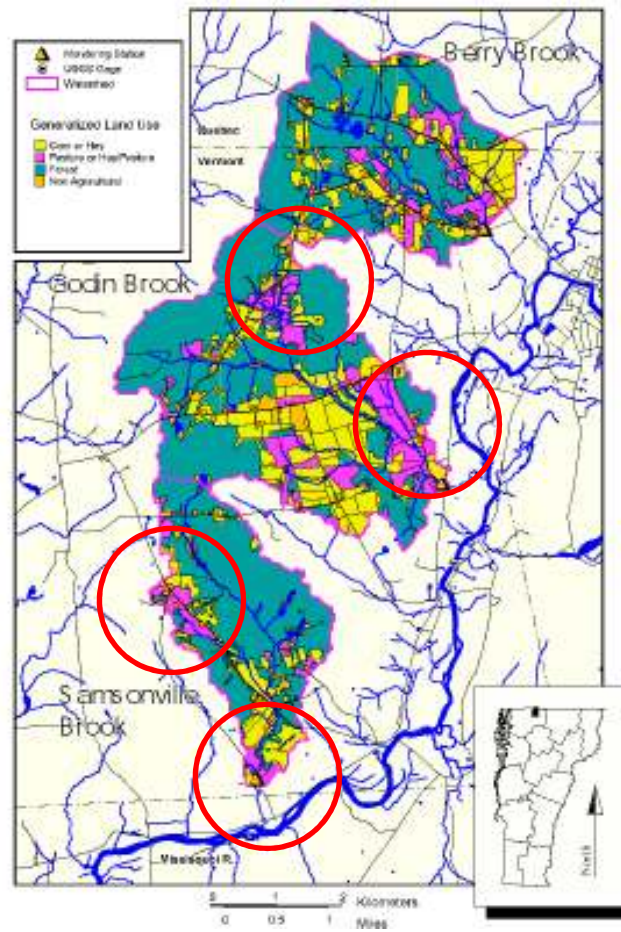
# VT 319 NMP



# VT 319 NMP

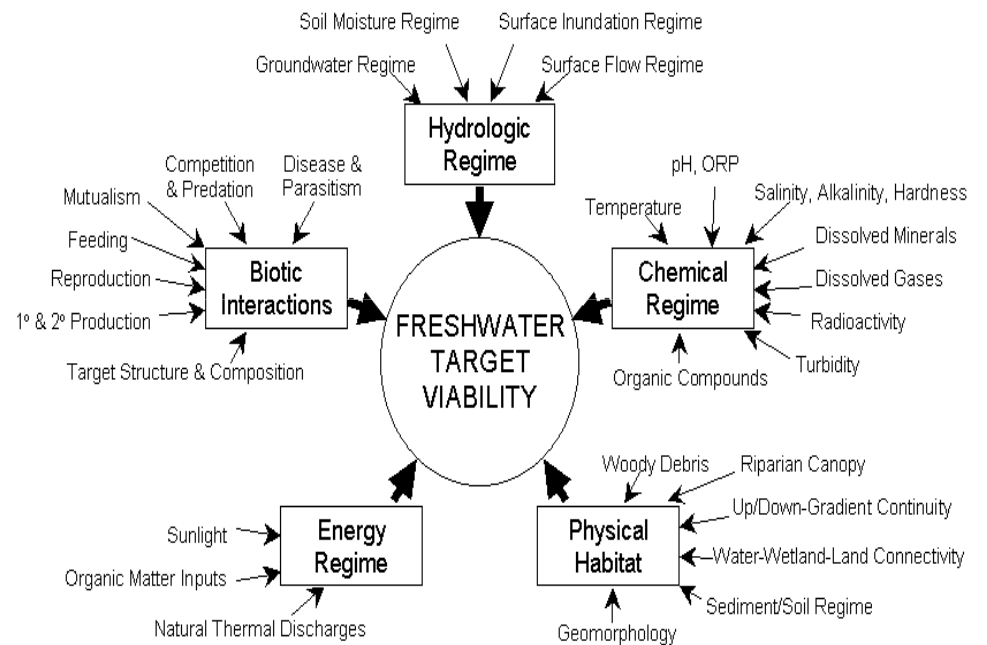


# VT 319 NMP



# Identification of stressors

- Where causes of biological impairment are unknown, use characterization data to help identify stressors



\* Modified from Karr et al. (1986).

# Stressor Identification

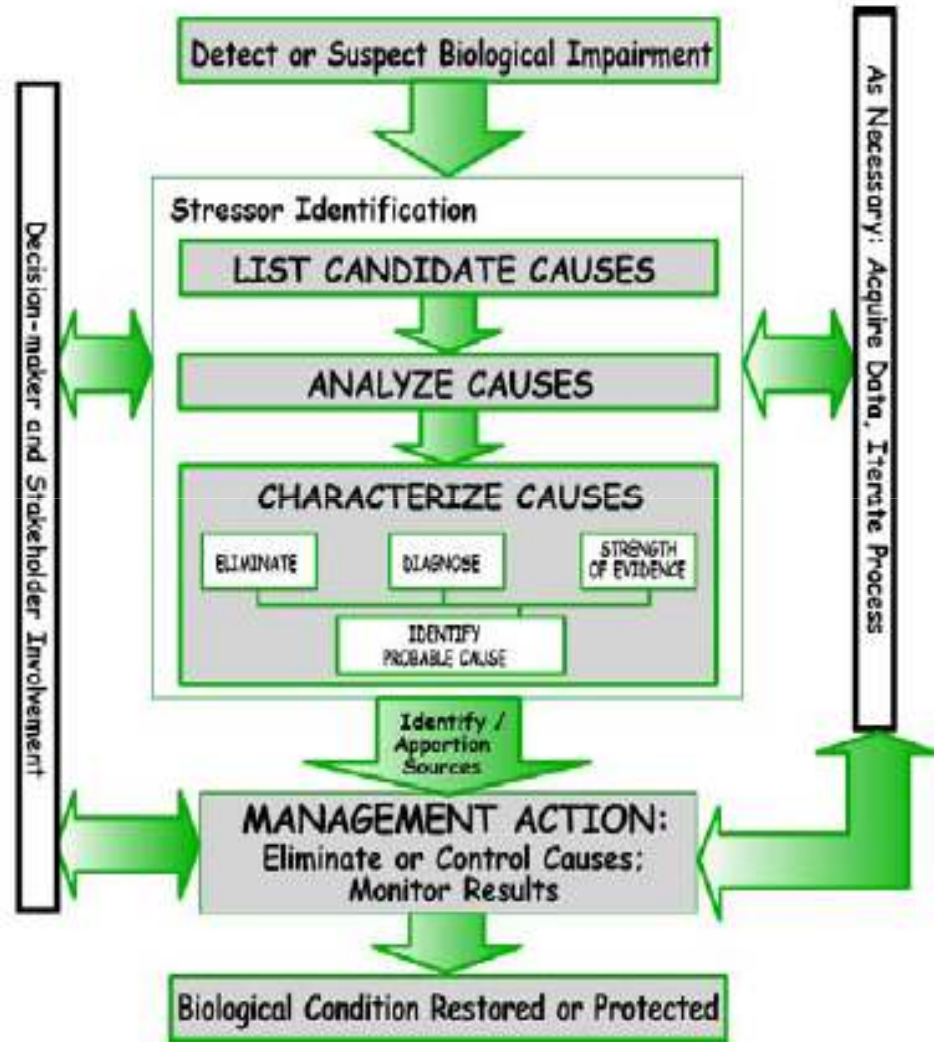


Figure 7-6. Stressor identification process.

# Stressor Identification

## Resources:

- USEPA *Stressor Identification Guidance Document*  
[www.epa.gov/waterscience/biocriteria/stressors/stressors.html](http://www.epa.gov/waterscience/biocriteria/stressors/stressors.html)
- *USEPA Causal Analysis/Diagnosis Decision Information System (CADDIS)*  
<http://cfpub.epa.gov/caddis/home.cfm>