

Stormwater Runoff into Sand Pits

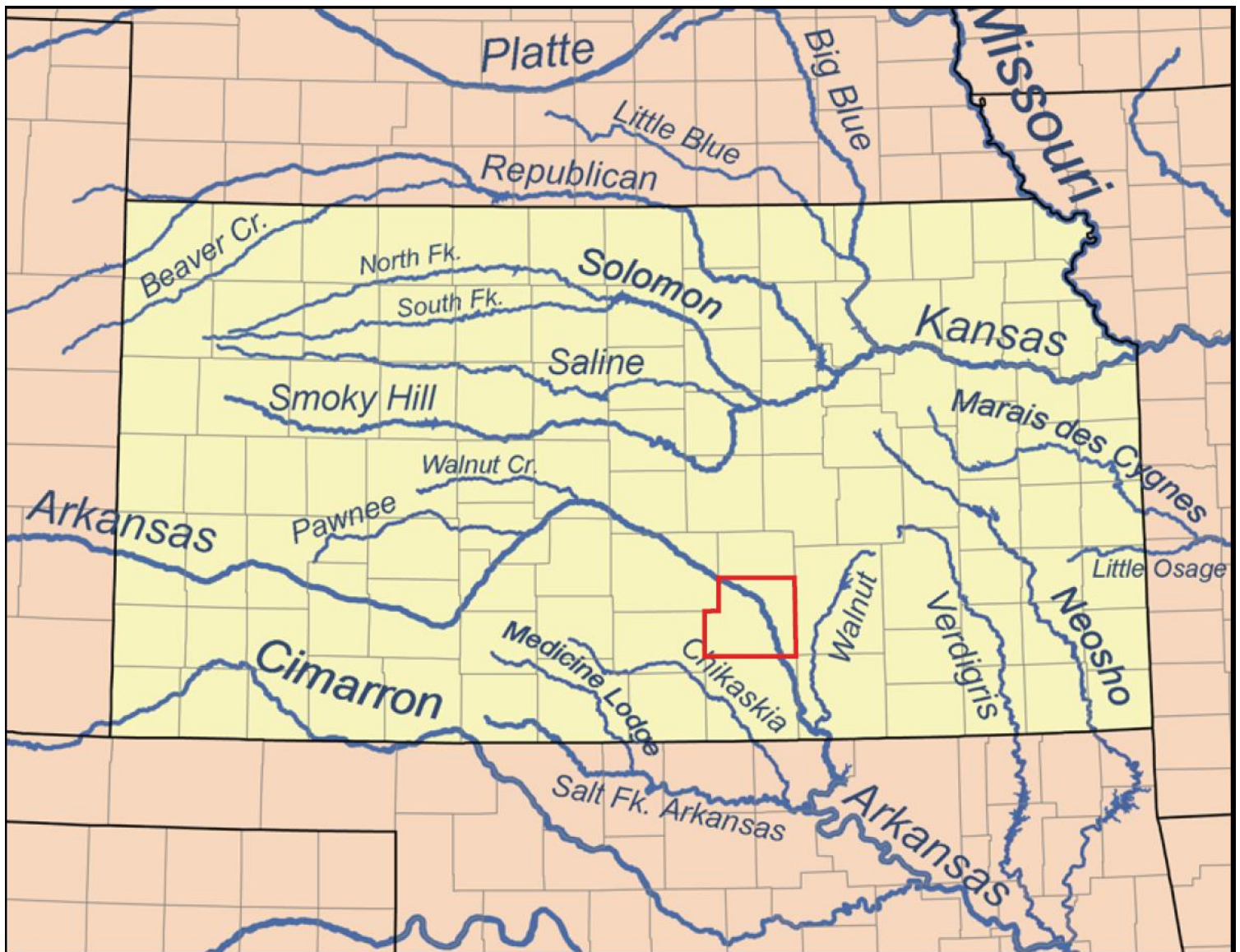
Catherine Johnson

Susan Erlenwein



Sedgwick County...
working for you





Sedgwick County...
working for you



Sedgwick County

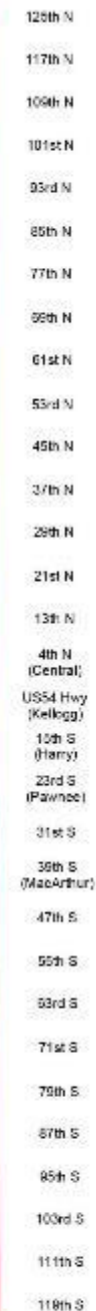
Demographics:

- **645,120 acres (1,008 square miles)**
 - **486,723 acres of farmland**
- **20 cities; largest is Wichita**
- **Population = 511,995**



Sedgwick County...
working for you





Sand & Gravel Pits



*Sedgwick County
working*



ISSUES

Stormwater Runoff

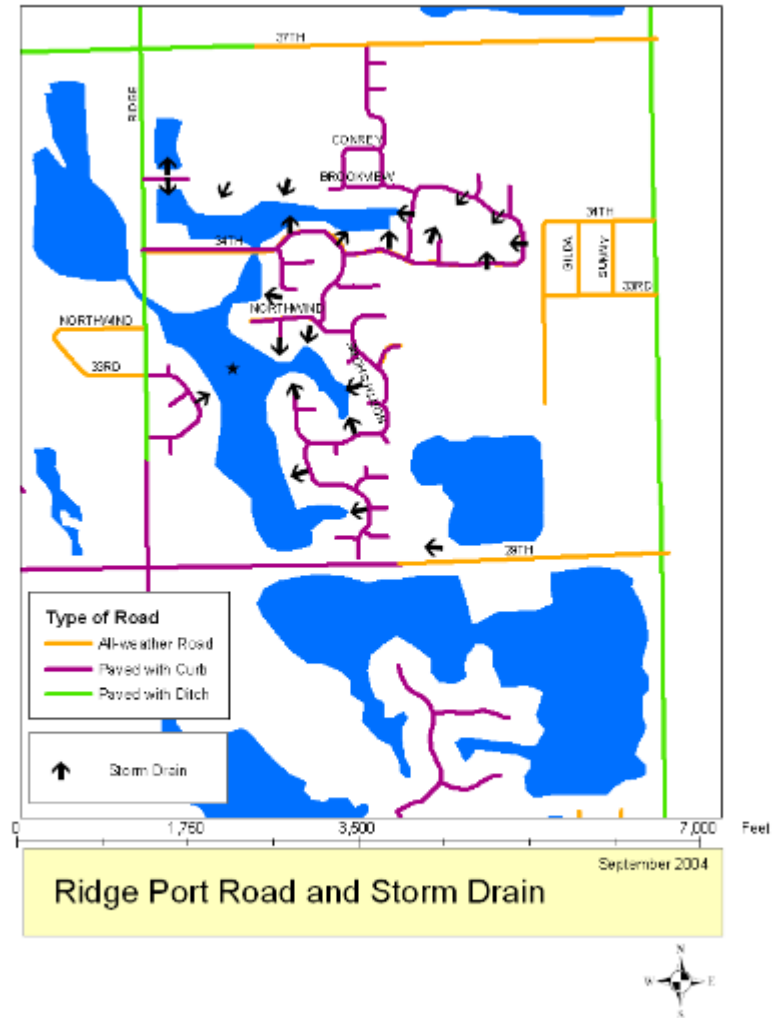


Sedgwick County...
working for you



ISSUES

Storm Drains



Sedgwick County...
working for you



ISSUES

Recreation



Potential Contamination vs. Development

SB 364

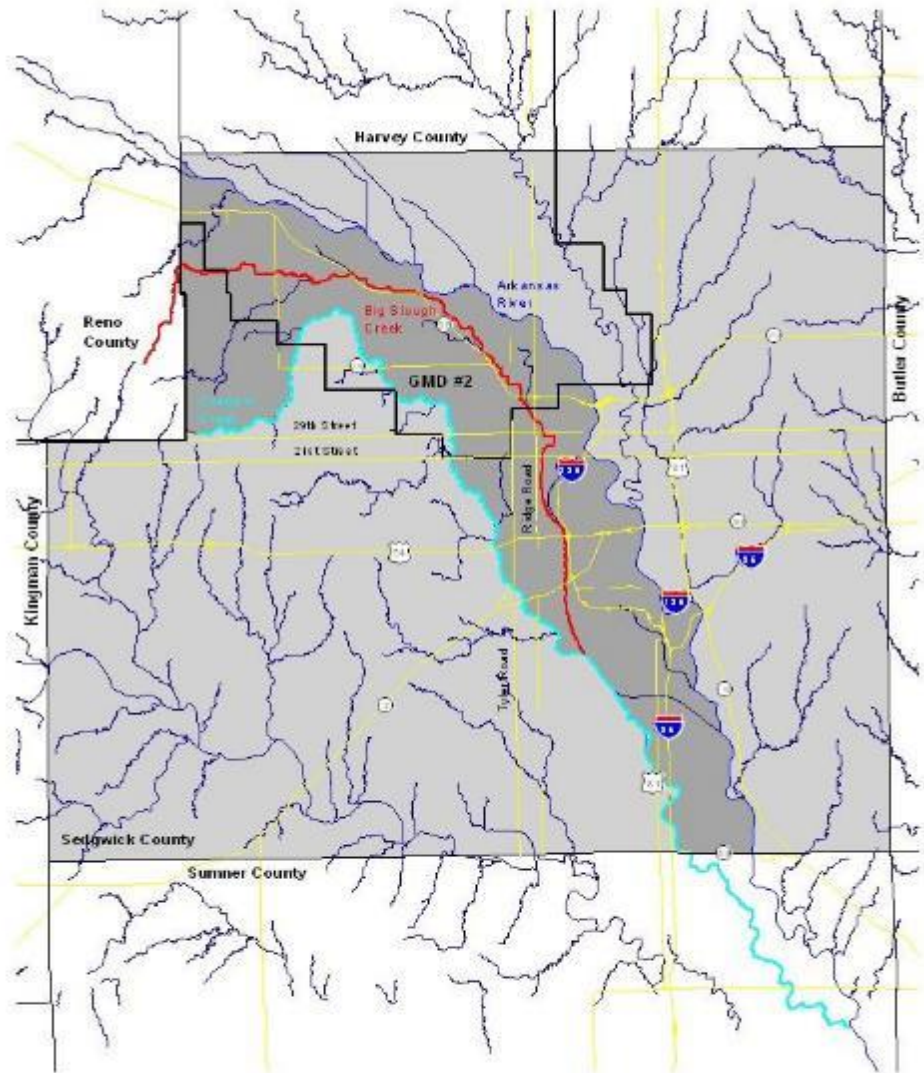
Sec. 2 ...shall study and develop recommendations regarding: [c] the pollution control and flood control impacts of diverting water runoff into sand and gravel pits



Sedgwick County...
working for you



Area of Interest



Sedgwick County...
working for you



Kansas Department of Agriculture
Division of Water Resources
Irrigation Services Section
June 21, 2006
T. Blackett

5 0 5 10 Miles



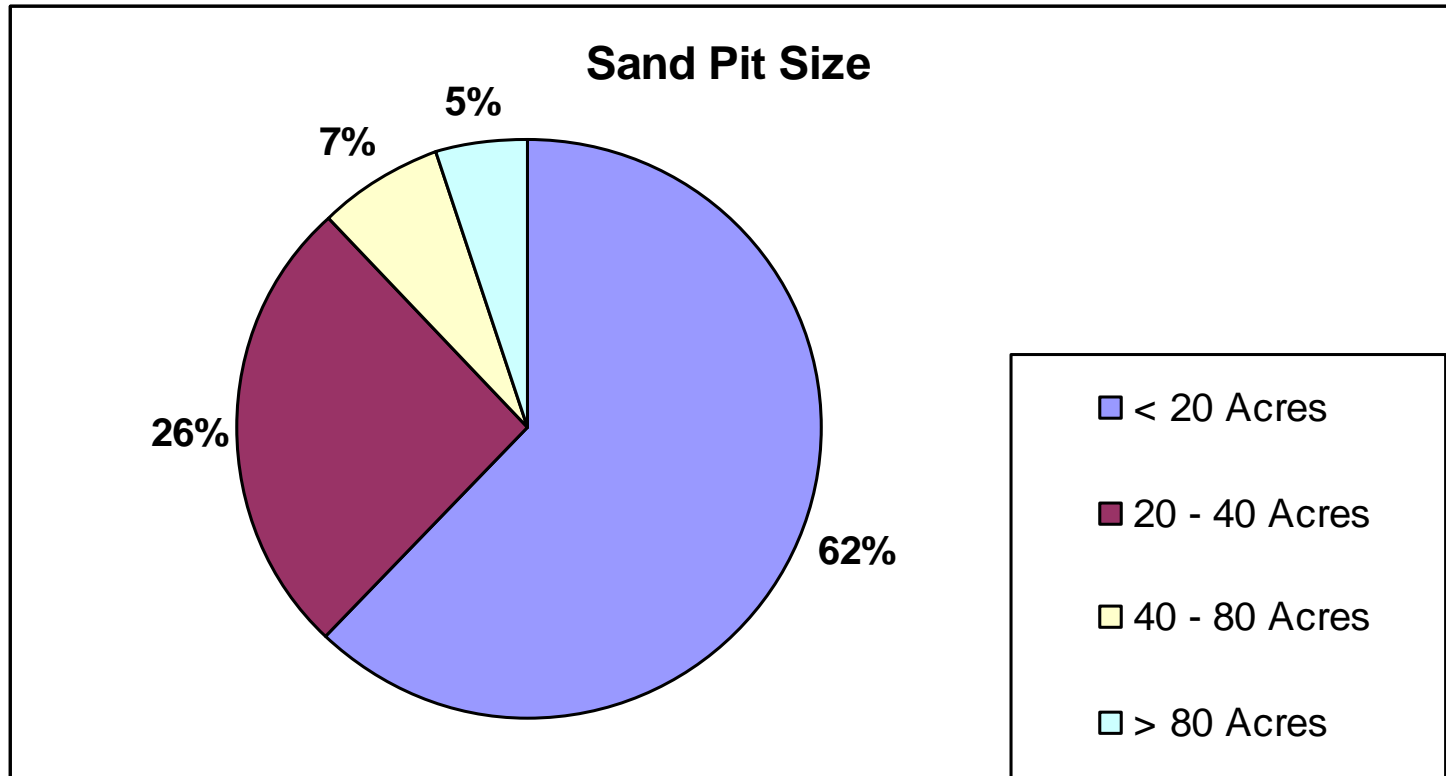
Sandpits



Sedgwick County...
working for you



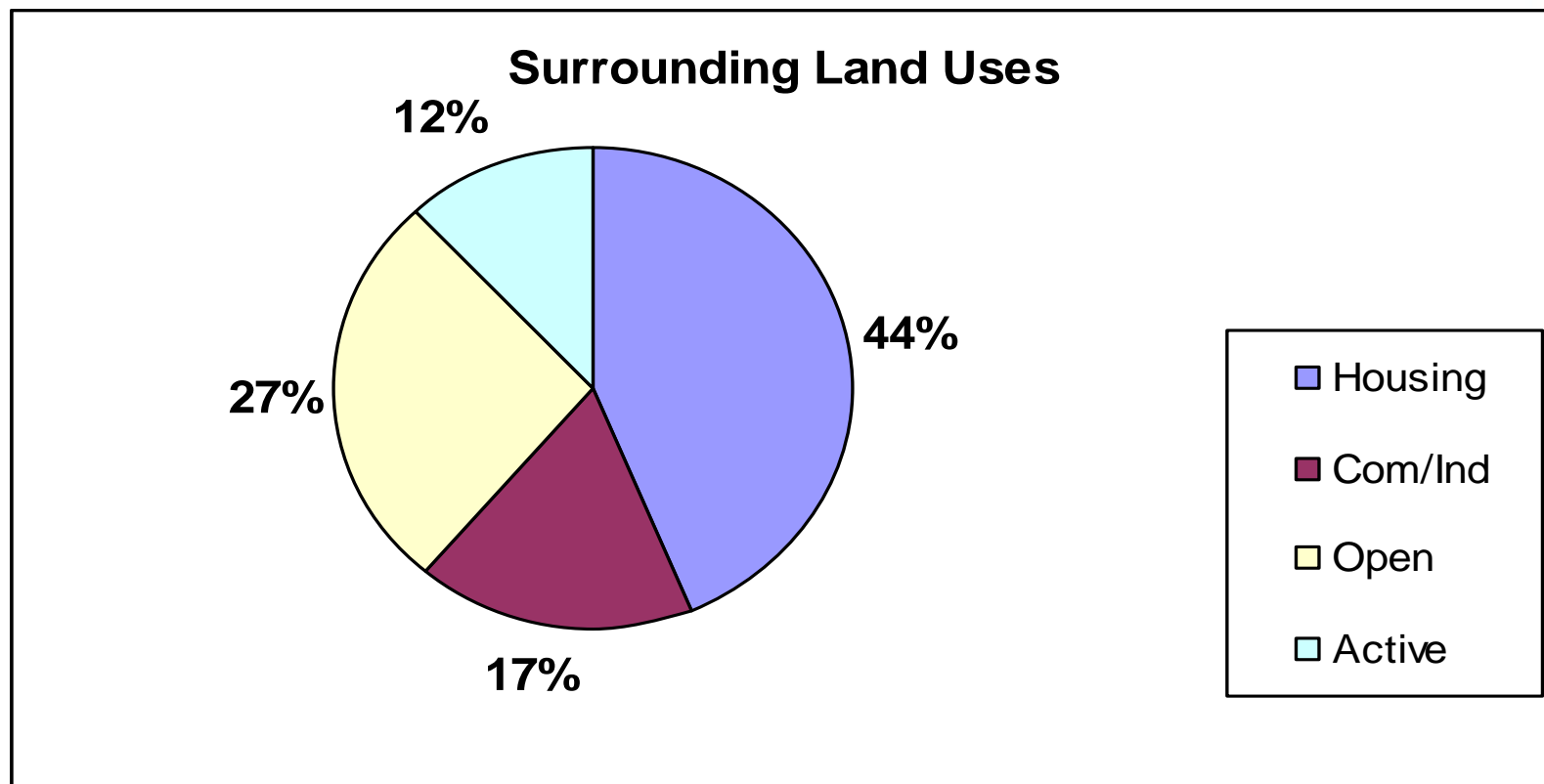
Sandpit Size



Sedgwick County...
working for you



Surrounding Land Use



Sedgwick County...
working for you



Considerations

- **Sandpit Characteristics**
 - size, soil and age
- **Past Use**
- **Development**
 - age, density and type
- **Road Characteristics**



Sedgwick County...
working for you



Considerations

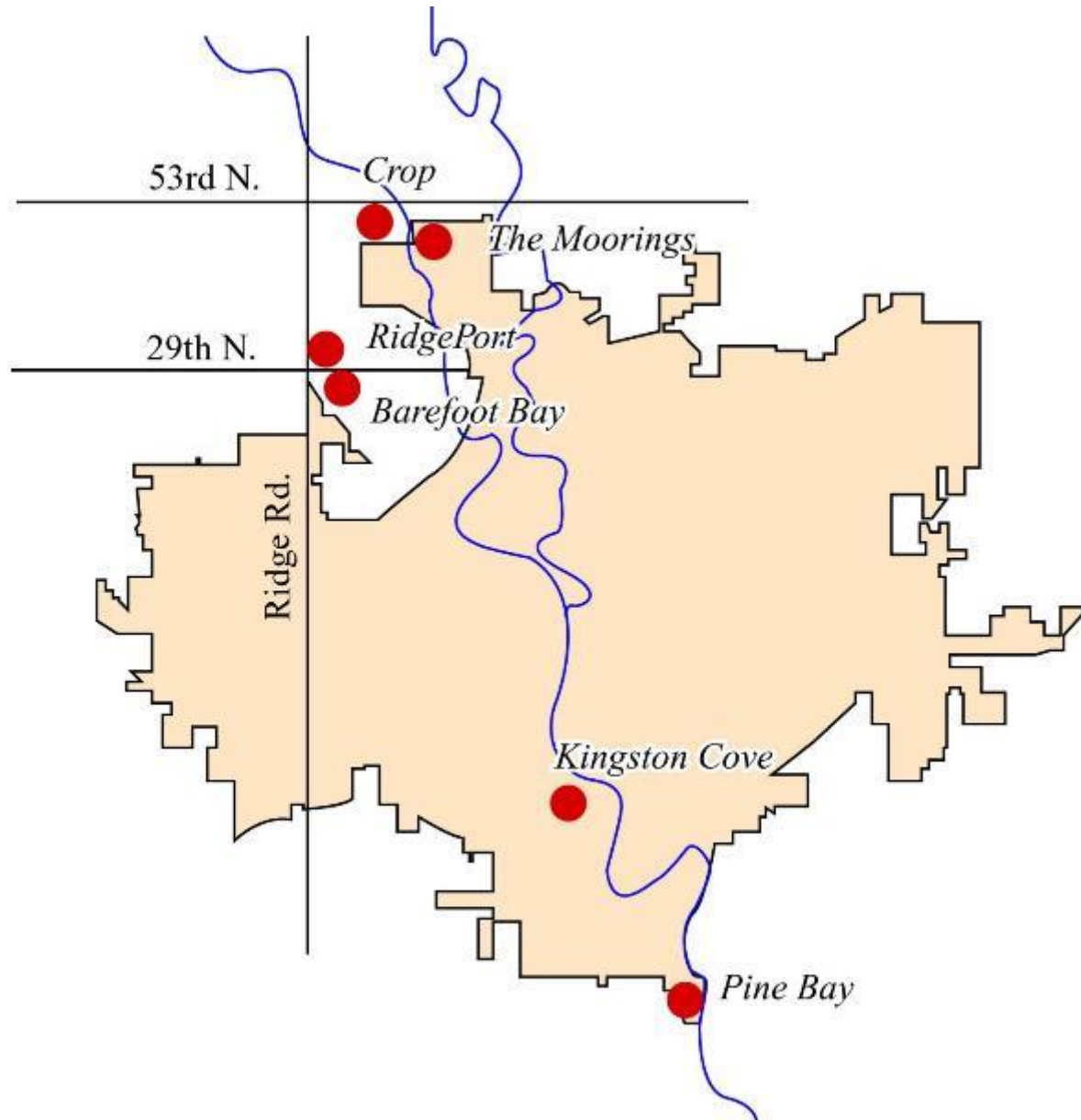
- ☞ **Stormwater Drainage**
- ☞ **Type of Sewage Disposal**
- ☞ **Local Pollution Source**
- ☞ **Recreational Use**
- ☞ **Accessible**



Sedgwick County...
working for you



Selected Sandpits



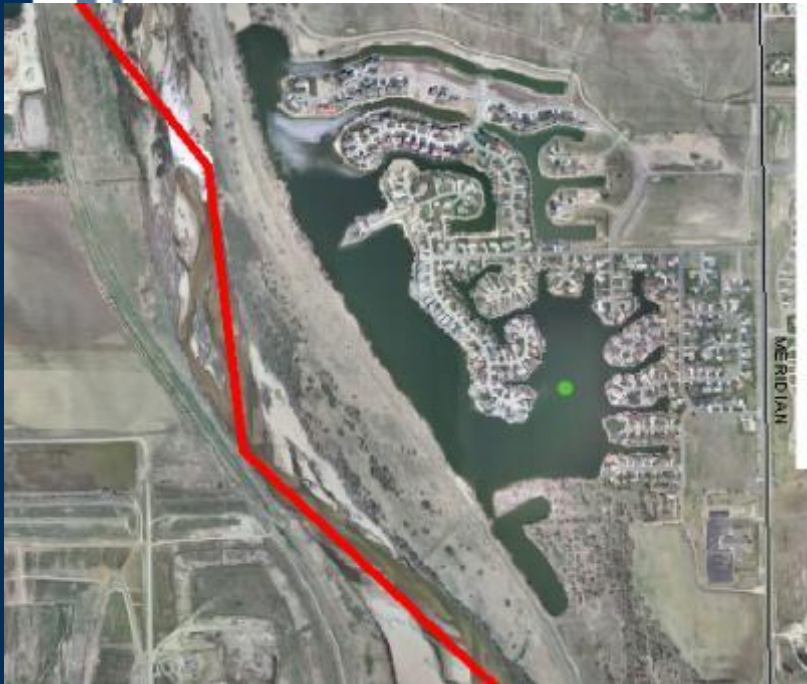
CHARACTERISTICS OF STUDY SITES

Name of pit	Type of area	Age of pit	Age of development	Water area, acres	Greatest depth, ft
Barefoot Bay	New residential	Active in 1974	1991 to 2004	113	30
Ridge Port	New residential	Cropland in 1997	1999 to present	87	6.7
The Moorings	Old residential	Active in 1968	1978 to present	111	31
Cropland	Control site, in cropland	Active in 1968	-	42	32
Kingston Cove	Apartments, commercial	Active in 1960	1968 to 1974	18	19
Pine Bay Estates	New residential, septic systems, golf course	Active in 1968	1986 to 2002	32	14

Control Sand pit (Crop)



The Moorings



Sedgwick County...
working for you

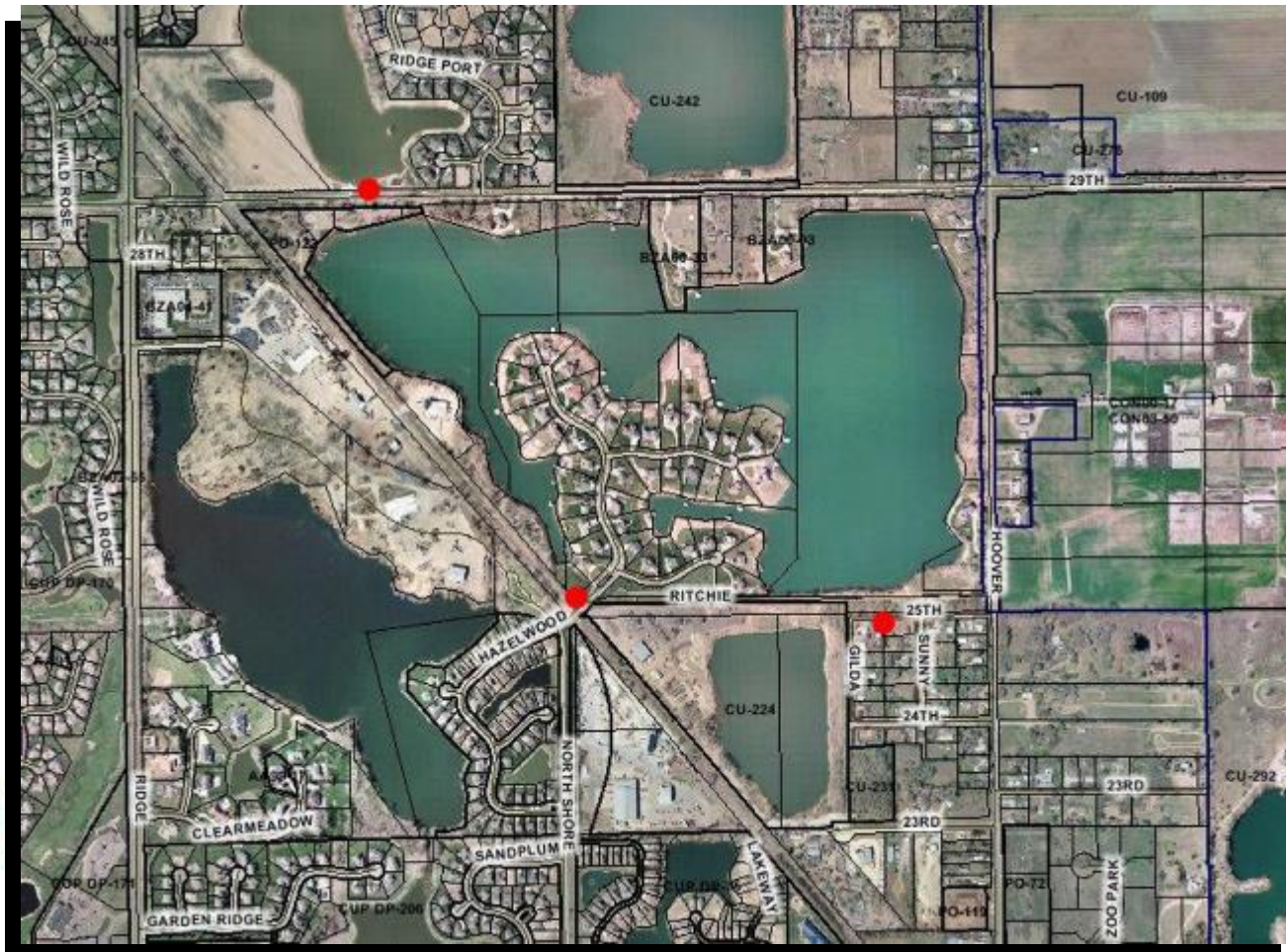
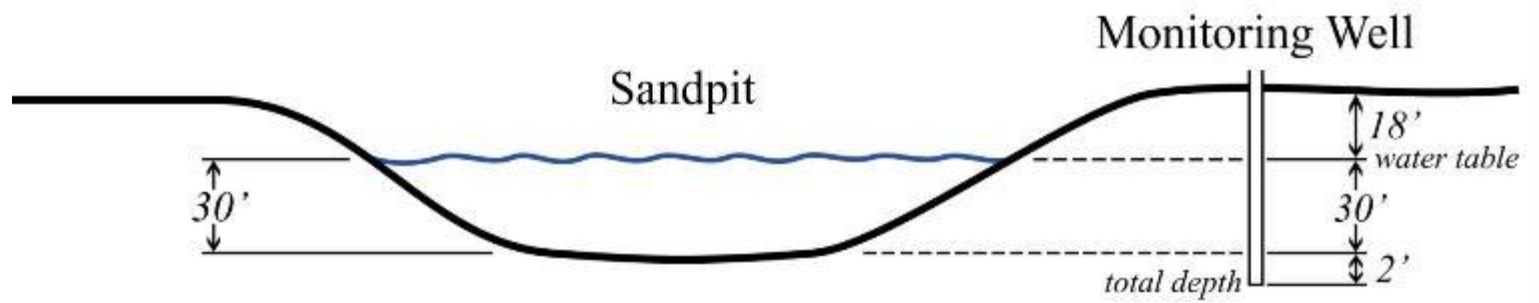


Barefoot Bay



Sedgwick County...
working for you







Sedgwick County...
working for you





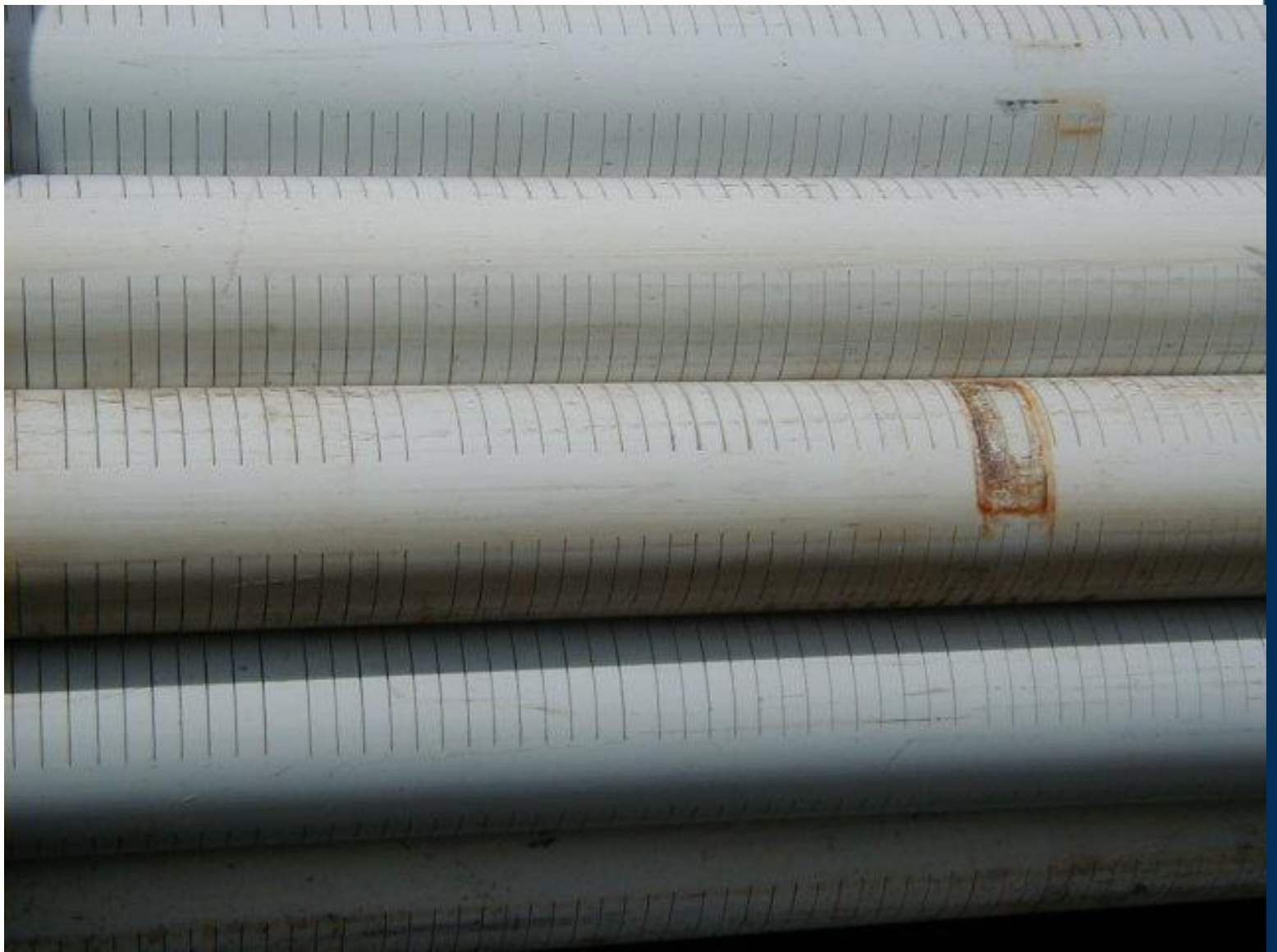
Sedgwick County...
working for you





Sedgwick County...
working for you





Sedgwick County...
working for you





Sedgwick County...
working for you



Sampling provided by USGS

Types of Samples

- Sand pit surface water
- Groundwater
- Pit sediment

Types of Water Analyses

- 18 physical & chemical properties
- 5 bacteriological values
- 40 inorganic constituents
- 118 pesticides & degradant compounds
- 134 other organic compounds



Sedgwick County...
working for you



Sediment Results

Sandpit Sediment:

Tested for: 5 physical & chemical properties; 45 inorganic compounds; 32 organic compounds.

Found: Arsenic, cadmium, chromium, copper, lead, nickel and zinc were observed in some of the sediments

- Chlordane, DDT, PCBs



Water Results

Inorganic Constituents:

- Total Dissolved Solids
- Chloride
- Iron and Manganese
- Arsenic



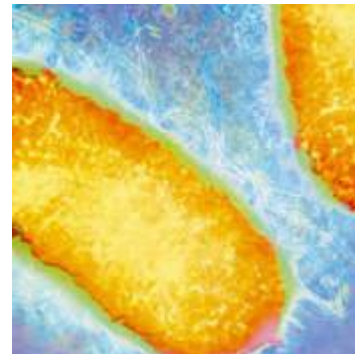
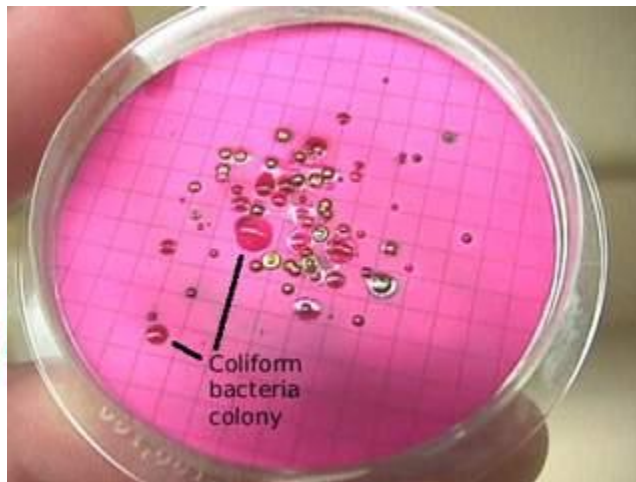
Sedgwick County...
working for you



Water Results

Bacteria:

- Bacteria levels in surface waters were less than the maximum for contact recreation except in one north sand pit
- All of the monitoring wells had detectable or measurable coliform bacteria
 - Lower in the wells than in the sand pits



Water Results

Organic Compounds (not pesticides):

- Six organic compounds were found in surface sand pit waters
- 19 different organic compounds were detected in well waters
- South groundwater samples contained many volatile organic compounds (VOCs)

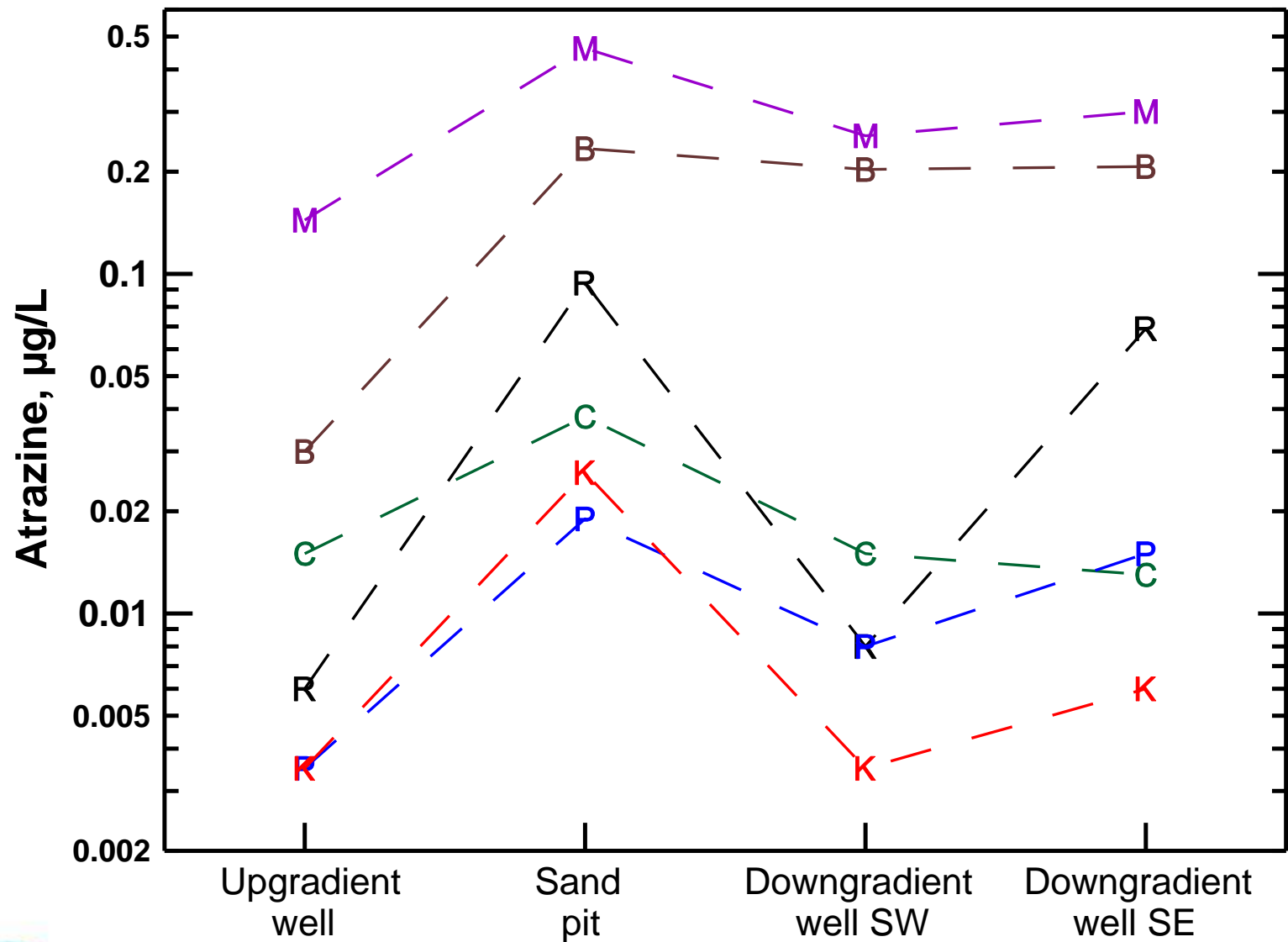


Water Results

Pesticide Compounds:

- 21 pesticides or their degraded compounds were detected in the surface or ground waters

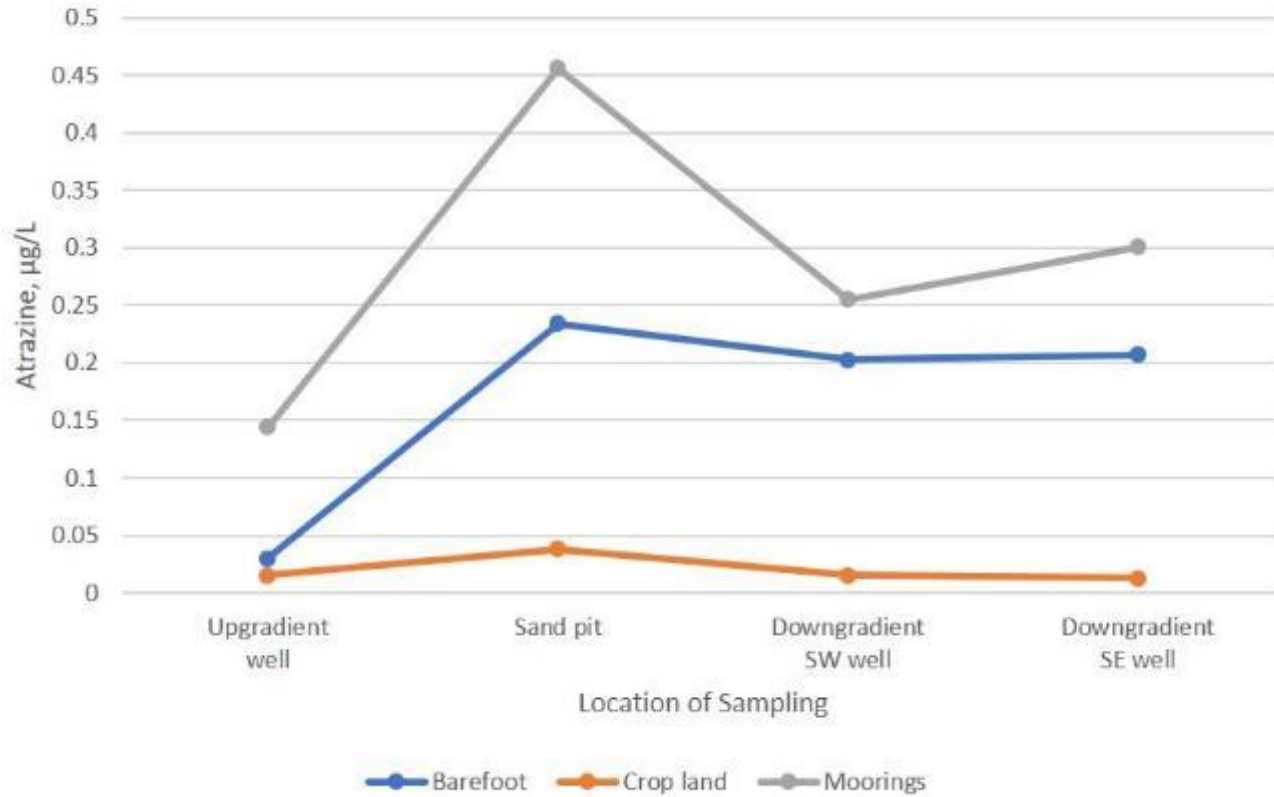




Sedgwick County...
working for you



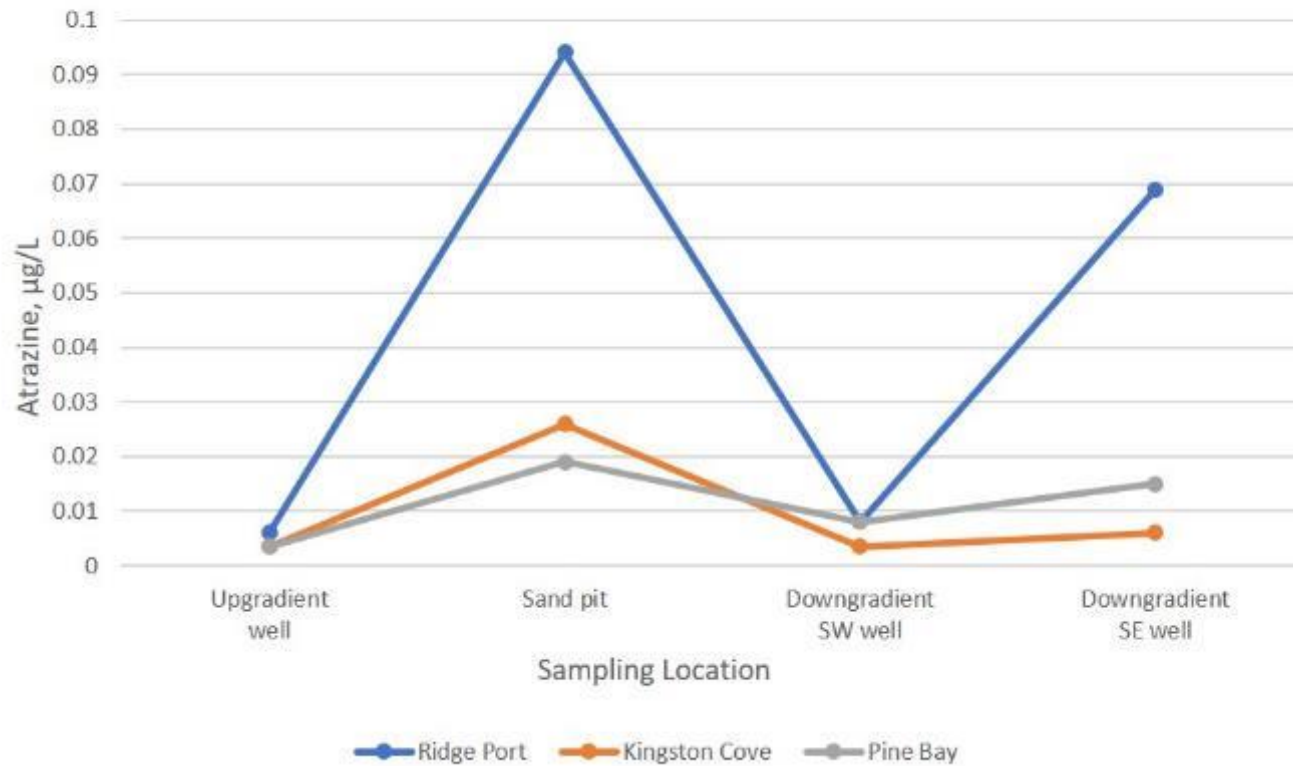
June 2006 Atrazine Concentration:
Samples from Sand Pit Sites in Wichita, KS



Sedgwick County...
working for you



Atrazine Concentration:
Samples from Sand Pit Sites in Wichita, KS



Sedgwick County...
working for you



Conclusions

In general, the concentrations of detected compounds were below regulated drinking water criteria

The overall concentration distributions of metals, pesticides and other organics indicate that surface water in the sand pits flows into the groundwater in the direction of groundwater flow

A potential threat to the groundwater exists if high-contamination concentrations occur



Sedgwick County...
working for you



Recommendations

Best Management Practices in future developments around sand pits

- Storm drains
- Buffer strips
- Educate Developers & Homeowners



Acknowledgments

Sedgwick County Environmental Resources
Equus Beds Groundwater Management District #2
Kansas Division of Water Resources
Kansas Geological Survey
Kansas Water Office
U.S. Bureau of Reclamation
U.S. Geological Survey
Wichita Builders Association



Sedgwick County...
working for you



THANK YOU



Sedgwick County...
working for you

