Stormwater Runoff into Sand Pits

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Sedgwick County

Demographics:

• 645,120 acres (1,008 square miles)
  • 486,723 acres of farmland
• 20 cities; largest is Wichita
• Population = 511,995
Sand & Gravel Pits
ISSUES

Stormwater Runoff
ISSUES

Storm Drains
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
Sandpits
Sandpit Size

- < 20 Acres: 62%
- 20 - 40 Acres: 26%
- 40 - 80 Acres: 7%
- > 80 Acres: 5%

Legend:
- < 20 Acres
- 20 - 40 Acres
- 40 - 80 Acres
- > 80 Acres
Surrounding Land Use

- Housing: 44%
- Com/Ind: 27%
- Open: 17%
- Active: 12%

Legend:
- Housing
- Com/Ind
- Open
- Active
Considerations

- Sandpit Characteristics
  - size, soil and age

- Past Use

- Development
  - age, density and type

- Road Characteristics
Considerations

- Stormwater Drainage
- Type of Sewage Disposal
- Local Pollution Source
- Recreational Use
- Accessible
Selected Sandpits
## CHARACTERISTICS OF STUDY SITES

<table>
<thead>
<tr>
<th>Name of pit</th>
<th>Type of area</th>
<th>Age of pit</th>
<th>Age of development</th>
<th>Water area, acres</th>
<th>Greatest depth, ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barefoot Bay</td>
<td>New residential</td>
<td>Active in 1974</td>
<td>1991 to 2004</td>
<td>113</td>
<td>30</td>
</tr>
<tr>
<td>Ridge Port</td>
<td>New residential</td>
<td>Cropland in 1997</td>
<td>1999 to present</td>
<td>87</td>
<td>6.7</td>
</tr>
<tr>
<td>The Moorings</td>
<td>Old residential</td>
<td>Active in 1968</td>
<td>1978 to present</td>
<td>111</td>
<td>31</td>
</tr>
<tr>
<td>Cropland</td>
<td>Control site, in cropland</td>
<td>Active in 1968</td>
<td>-</td>
<td>42</td>
<td>32</td>
</tr>
<tr>
<td>Kingston Cove</td>
<td>Apartments, commercial</td>
<td>Active in 1960</td>
<td>1968 to 1974</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>Pine Bay Estates</td>
<td>New residential, septic systems, golf course</td>
<td>Active in 1968</td>
<td>1986 to 2002</td>
<td>32</td>
<td>14</td>
</tr>
</tbody>
</table>
Control Sand pit (Crop)
The Moorings
Barefoot Bay
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
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
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
June 2006 Atrazine Concentration:
Samples from Sand Pit Sites in Wichita, KS

Location of Sampling

- Upgradient well
- Sand pit
- Downgradient SW well
- Downgradient SE well

Atrazine, μg/L

- Barefoot
- Crop land
- Moorings
Atrazine Concentration:
Samples from Sand Pit Sites in Wichita, KS

Sampling Location
- Upgradient well
- Sand pit
- Downgradient SW well
- Downgradient SE well

Atrazine, µg/L
- Ridge Port
- Kingston Cove
- Pine Bay

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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.
Recommendations

Best Management Practices in future developments around sand pits

• Storm drains
• Buffer strips
• Educate Developers & Homeowners
Acknowledgments

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THANK YOU