

Groundwater Monitoring



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Groundwater Monitoring at Livestock Facilities

- Actively monitoring >300 facilities
- 357 approved GWMPs
- 414 recommended for monitoring
- Mostly larges (< 10 mediums)
- Most biannually since 1997 (8 annual)
- Nitrate, Ammonia & Chloride
- Water level, Conductivity, pH & Temp.
- Only monitor waste control facility

Statistics

Number of Facilities

Years Sampled

296

1

242

5

88

10

5

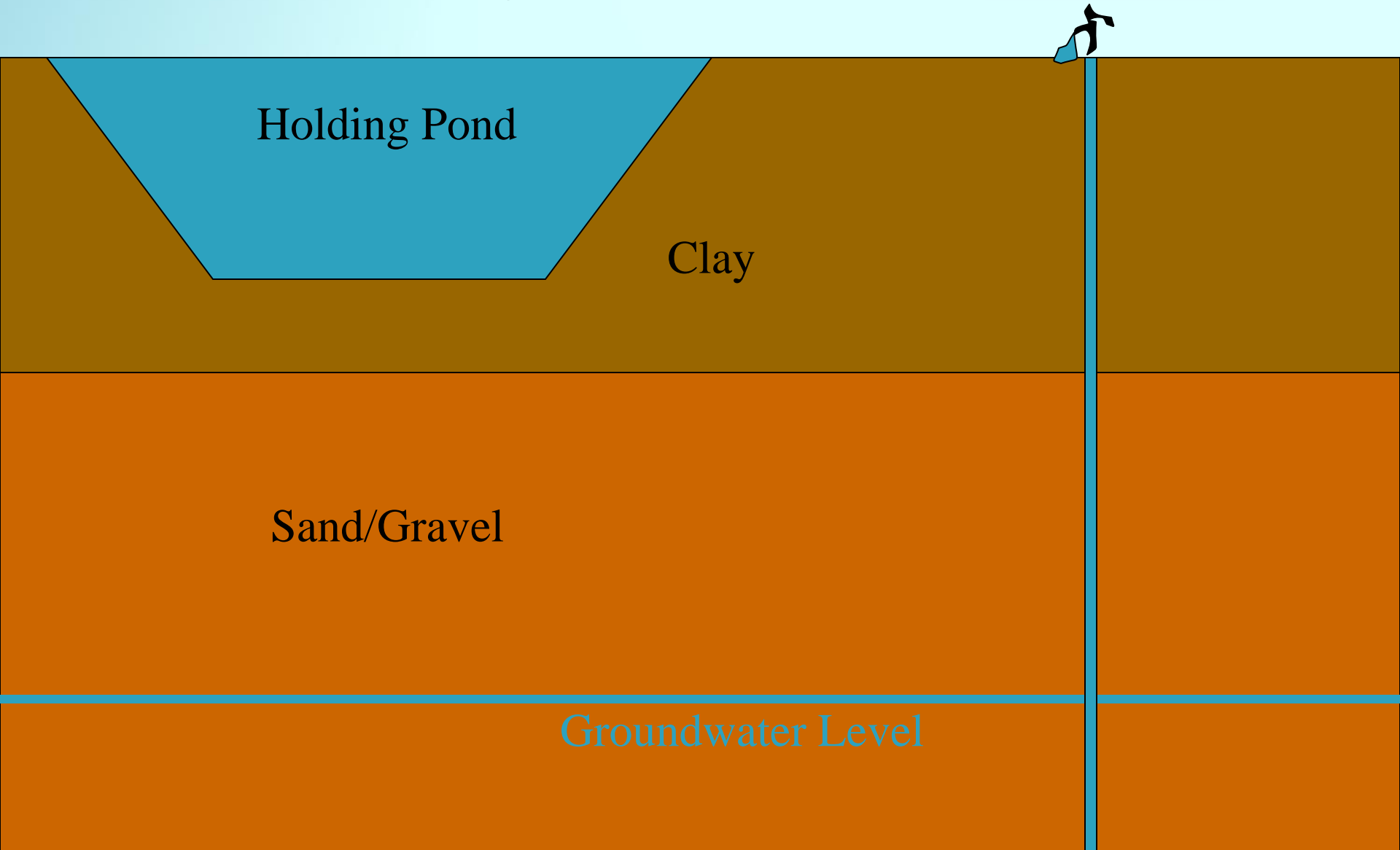
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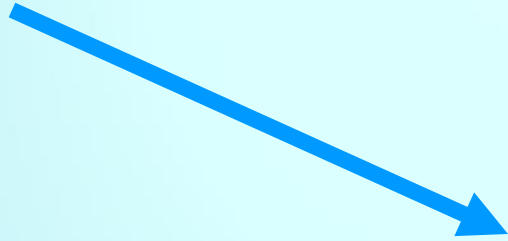
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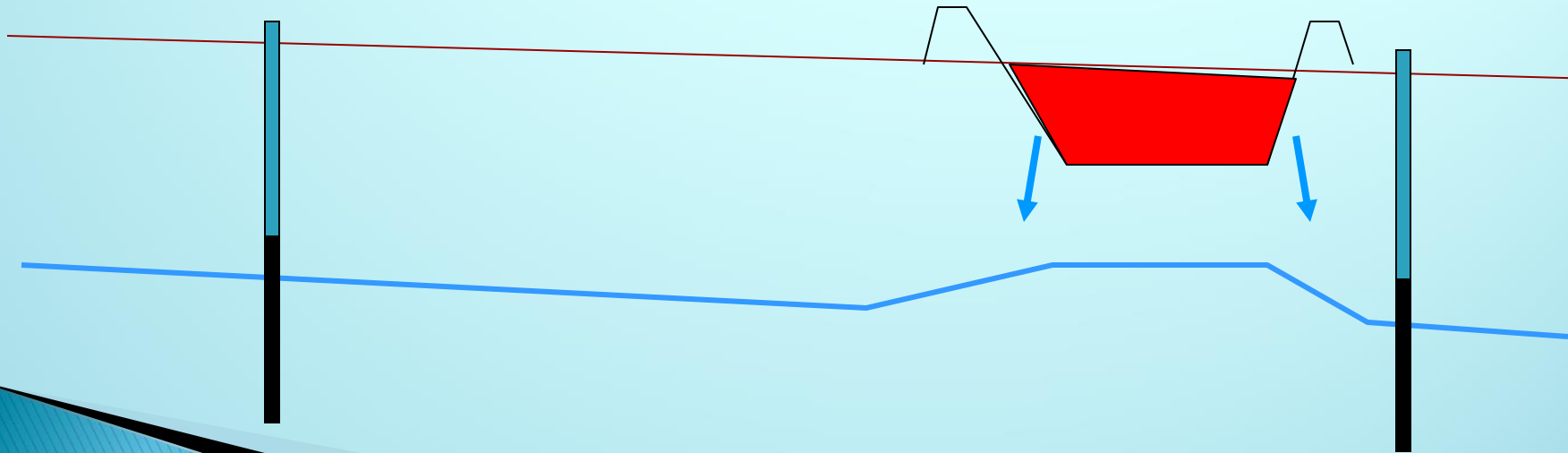
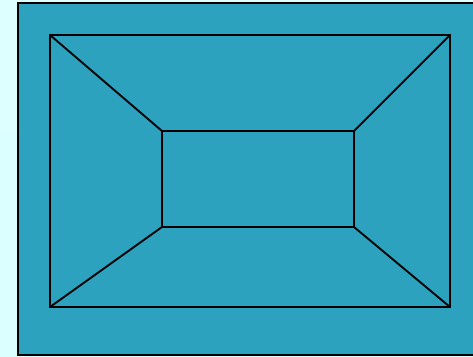
Why is it required?



What are we looking for?



Map View



Cross Section View

What's in Groundwater?

- Nitrate – Less than 3 ppm.
- Ammonia – Less than 1 ppm
- Chloride – Less than 50 ppm.

What's in livestock waste?

- ▶ Nitrate – Less than 3 ppm.
- ▶ Ammonia – 20 to 200 ppm (cattle), 550 to 900 ppm (swine).
- ▶ Chloride – 300 to 600 ppm.

What's in the results.

- ▶ Nitrate – 0 to 450 ppm.
- ▶ Ammonia – 0 to 200 ppm
- ▶ Chloride – 1 to 1200 ppm.

Are there problems?





Some.









What has been done?

More wells

Deeper wells

Shallower wells

Wells in different locations

Soil sampling

More geologic information

Camera wells

Re-survey wells (elevation)

More frequent sampling

Historic review

Engineering review

Records review

Resistivity study

Surface water sampling

Sample neighbors well

Re-route surface drainage

Well inventory

Site visits

Phyto-remediation

Nested wells

Reconstruction of wells

Reconstruction of lagoon

Long Term Goals

- Protect all receptors
- Identify source
- Work with producer to eliminate the source

Questions?

