

# Early Warning Wastewater Pond Monitoring System



Partnership of AgraTek LLC, Settje AgriServices and Engineering Inc., Nebraska Cattlemen's Association, USDA, ARS U.S.MARC and University of Nebraska-Lincoln Biological Systems Engineering Department

## Why This Issue is Important

- Protecting ground and surface water quality is critical to industries storing wastewater.
- Earthen structures are commonly used for this purpose.
- Early detection of seepage is critical to protect the environment.
- Monitoring wells, typically used, can only detect issues after contaminant reaches groundwater.

## The Proposed Technology and How it Works

- A sensor system just under the soil surface adapts a time-tested technology (measuring soil or groundwater electrical conductivity) to measure changes in soil and groundwater quality down-gradient from the holding pond.
- A combination of sensors are activated to measure soil and groundwater quality at specific depths and locations along the pond perimeter.
- By changing the probe combinations between which electrical conductivity is measured, an array can be created that functions as a sensor curtain deep into the soil and groundwater.
- Because the sensor curtain is located close to the pond perimeter with constant measurements, seepage is detected immediately.

## Why This Technology is Better

Monitoring wells detect leakage after contaminants reach groundwater, typically long after discharge happens. Water quality samples are taken semi-annually to monitor for leakage. In contrast, the new system:

- Provides continuous monitoring at many sub-surface points traversing the perimeter of the pond.
- Detects discharge before it reaches groundwater.
- Can be wirelessly linked to the web for remote access.
- Can interface with other control and monitoring systems for expanded versatility.

## Partners and Their Roles

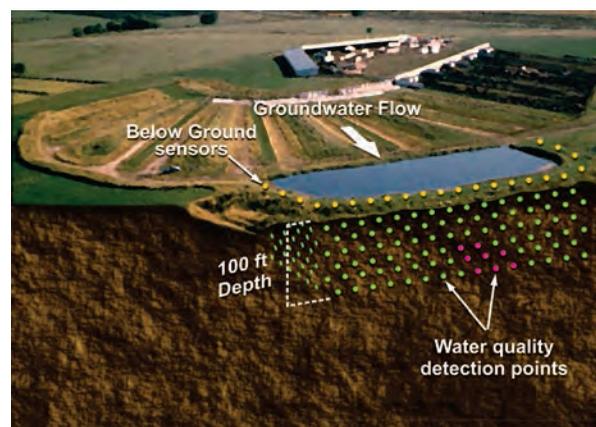
- AgraTek LLC: Electronics/Software development
- Settje AgriServices and Engineering: Marketing, system installations, system data management services.
- Nebraska Cattlemen: Product and market development
- USDA, ARS U.S.MARC: Technology research and development.
- UNL Biological Systems Engineering: Technology development and application.

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Earthen holding pond for cattle feedlot runoff.



Below-ground sensor field (yellow dots) is placed around perimeter of pond.

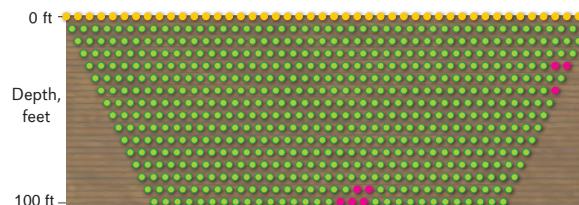


Illustration of sensor field (yellow dots) and below ground locations of detection points for electrical conductivity (green and red dots).

