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THE BIG CREEK RESEARCH & EXTENSION TEAM
SUSTAINABLE MANAGEMENT OF NUTRIENTS ON THE C&H FARM IN BIG CREEK WATERSHED
UofA
DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

The team

Andrew Sharpley	Soil & water quality, watershed mgt.
Rick Cartwright	Assoc. Dir. Extension for Agric. & Natural Resources
Kris Brye	Soil physics, pedology, sustainability, nutrient leaching
Mark Cochran	Vice President, U of A System Division of Agriculture
Mike Daniels	Extension water quality & nutrient mgt. specialist
Brian Haggard	Ecological engineering, water quality monitoring
Phil Hays (USGS)	Karst hydrogeology and groundwater quality
Tim Kresse (USGS)	Ground and stream water quality
Nathan McKinney	Asst. Dir. Agric. Expt. Station
Mary Savin	Structure & function of microbial communities
Thad Scott	Water quality, stream ecology and response
Karl VanDevender	Extension engineer, manure mgt. & planning
Adam Willis	County Extension Agent - Agriculture
Jun Zhu	Manure treatment technologies, ag. sustainability
Field technicians	Equipment construction, soil & water sampling experts

Project objectives

- ✓ Monitor fate & transport of nutrients & bacteria from land-applied swine slurry
- ✓ Assess impact of farm operations on water quality of springs, streams & ground water on & adjacent to the farm
- ✓ Determine sustainability of manure solid-liquid separation that may enhance off-farm export of manure & nutrients

Our partners

USGS
science for a changing world

NRCS
Natural Resources Conservation Service

Arkansas Association of Conservation Districts

GREAT SEAL OF THE STATE OF ARKANSAS

ARKANSAS NATURAL RESOURCES COMMISSION
CONSERVATION
DEVELOPMENT

Cooperating with

NATIONAL PARK SERVICE

So far, we have ….

- Conducted
  - LIDAR topographic survey
  - Grid soil sampling (0.25-acre grid)
  - Ground penetrating radar

Water quality

- ✓ Storm & weekly sampling of base flow in Big Creek & springs samples
  - Nutrients, sediment, bacteria
- ✓ Field runoff & leaching in application fields

Water sampling

- Big Creek
- Ephemeral stream
- Spring

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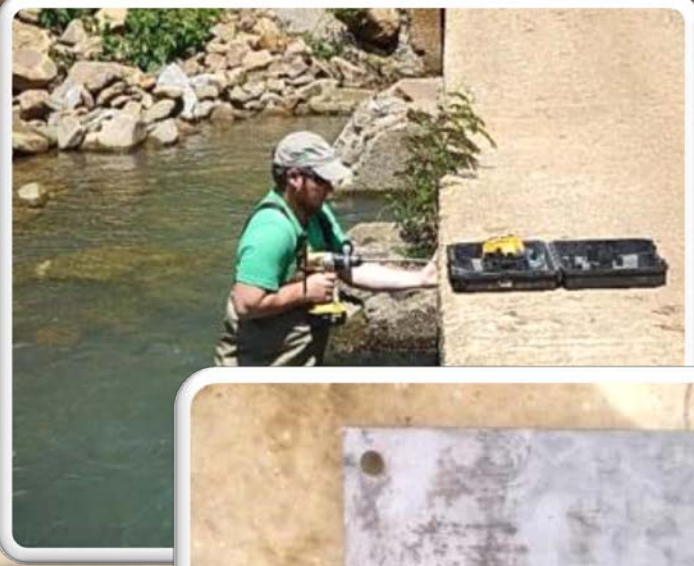
Upstream site



USGS gauging site downstream of farm

Real time

Flow

Nitrate

Temperature

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USGS 07055790 Big Creek near Mt. Judea, AR

PROVISIONAL DATA SUBJECT TO REVISION

Available data for this site | Time-series: Current/Historical Observations | GO

Click to hidestation-specific text
Station operated in cooperation with:

United States Geological Survey | University of Arkansas Division of Agriculture

This station managed by the Little Rock Office.

Available Parameters	Available Period
All 4 Available Parameters for this site	
00065 Gage height	2014-04-22 2014-07-07
00045 Precipitation	2014-04-21 2014-07-07
00010 Temperature, water	2014-04-21 2014-07-07
00631 NO3+NO2, wf	2014-05-22 2014-07-07

Output format

- Graph
- Graph w/ stats
- Graph w/o stats
- Graph w/ (up to 3) parms
- Table
- Tab-separated

Days (46) Summary of all available data for this site
Instantaneous-data availability statement

GO

-- or --

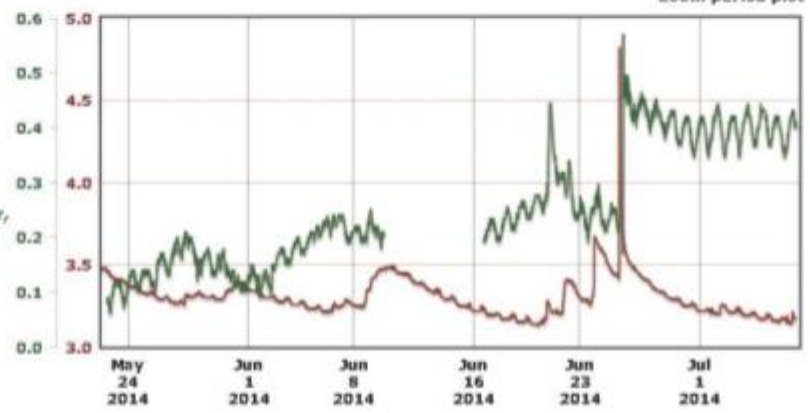
Begin date 2014-05-22

End date 2014-07-07

USGS 07055790 Big Creek near Mt. Judea, AR

Thursda
Jun 26
2014
12:48

Zoom period plot



Period selected plot

Explanation

3.49 Gage height

0.432 Nitrate plus nitrite

Spring site

Spring box captures & directs water to cattle trough

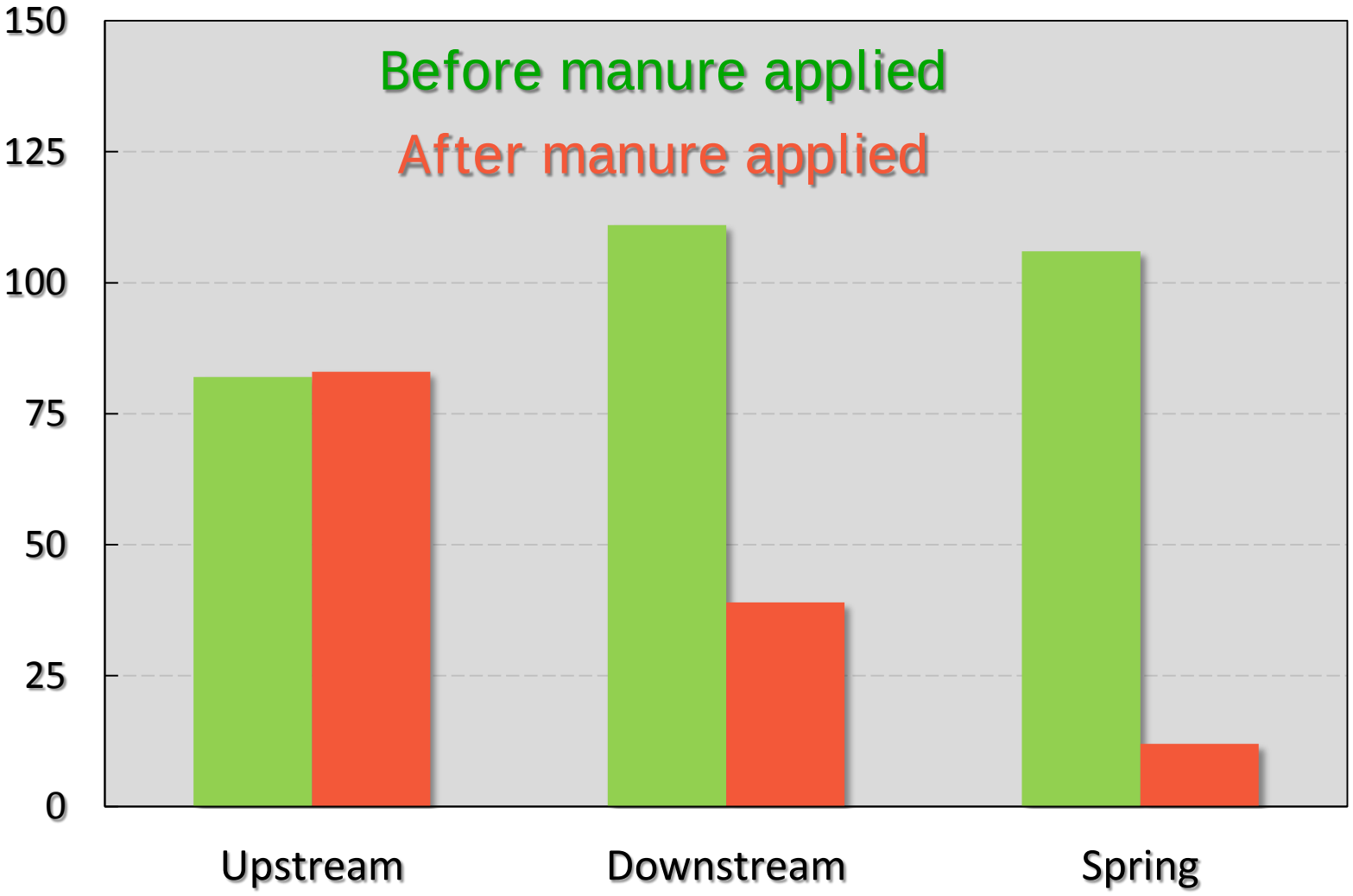
Ephemeral stream site

Big Creek water quality, mg/L

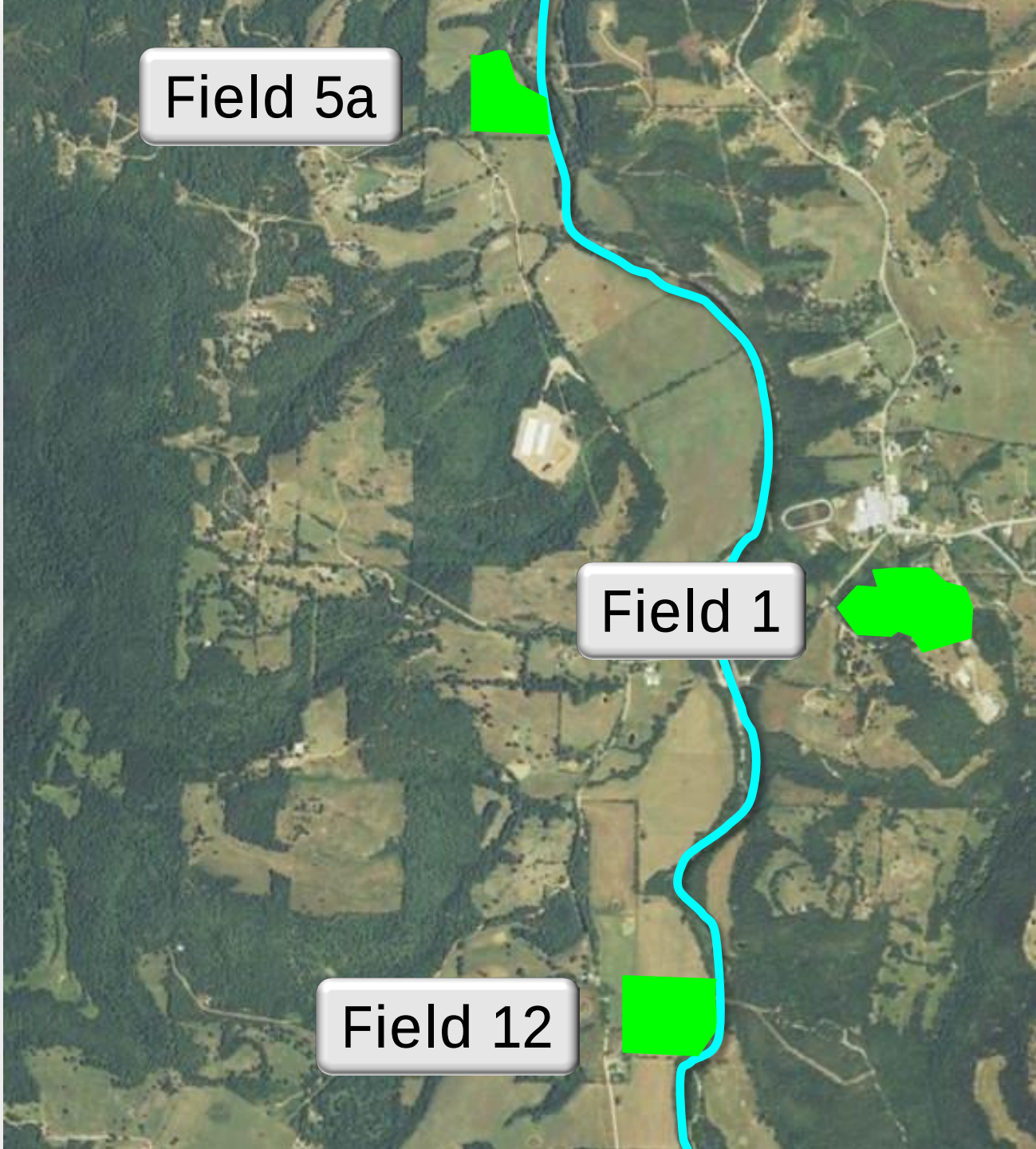
	Stream						Spring	
	Diss. P		Total P		Nitrate-N		Diss. P	Nitrate-N
	Up	Down	Up	Down	Up	Down		
Sept	0.015	0.010	0.064	0.024	0.35	0.45	0.005	0.25
Oct	0.014	0.021	0.033	0.086	0.47	0.60	0.006	0.18
Nov	0.017	0.019	0.032	0.051	0.21	0.23	0.008	1.82
Dec	0.009	0.007	0.024	0.022	0.17	0.28	0.007	0.71
Jan	0.009	0.010	0.022	0.026	0.17	0.36	0.008	2.13
Feb	0.008	0.008	0.019	0.015	0.07	0.15	0.007	0.61
Mar	0.008	0.009	0.033	0.033	0.11	0.20	0.008	0.64
April	0.023	0.013	0.206	0.035	0.07	0.14	0.012	0.51
May	0.008	0.008	0.031	0.032	0.09	0.14	0.008	0.39

Big Creek - *E. coli*

E. coli geometric mean (MPN/100mL)



Sampling for field runoff and leaching



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Autosampler
Flume
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Surface runoff
monitoring
6712
ISCO


Field wells

Field wells


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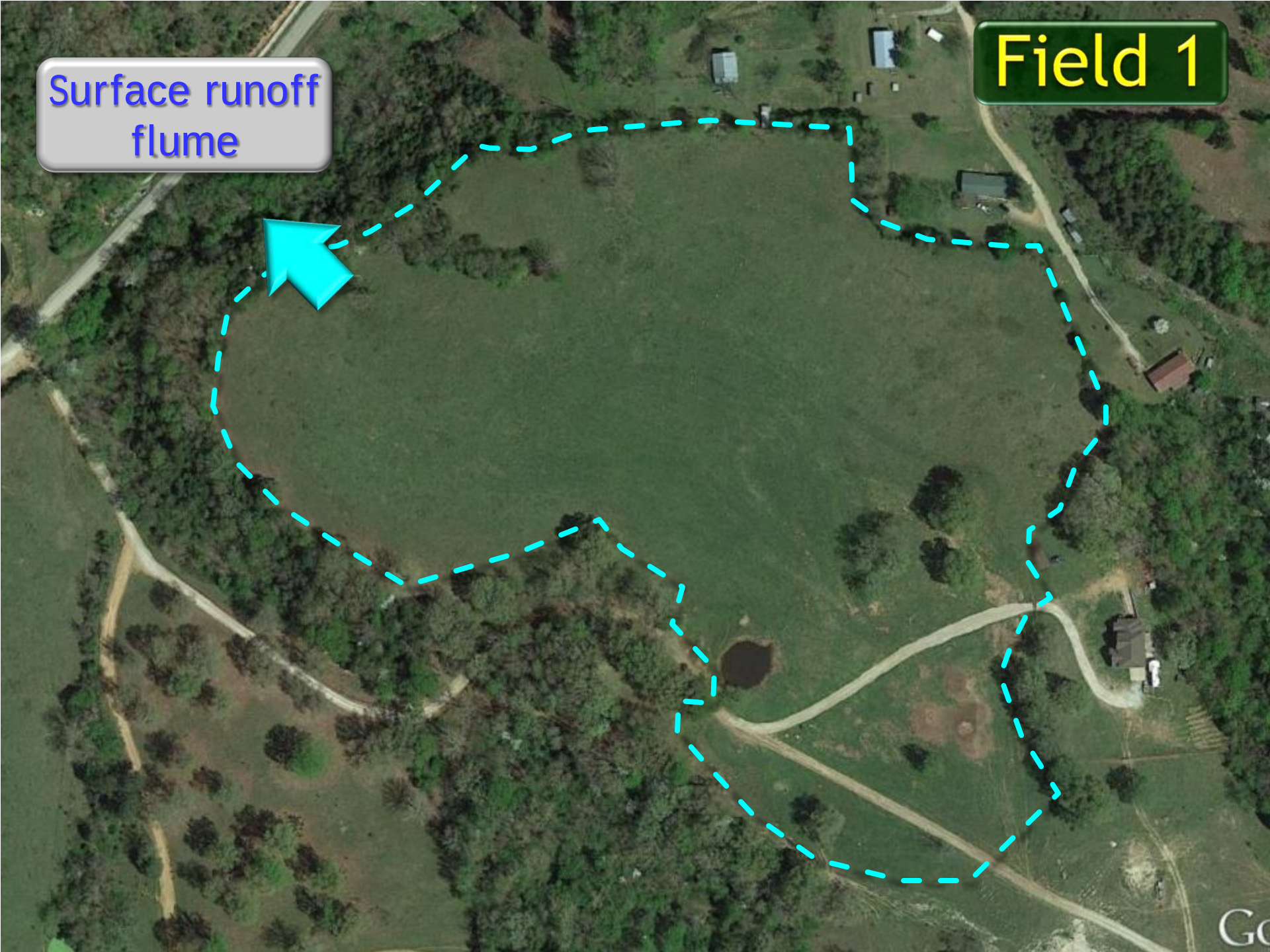
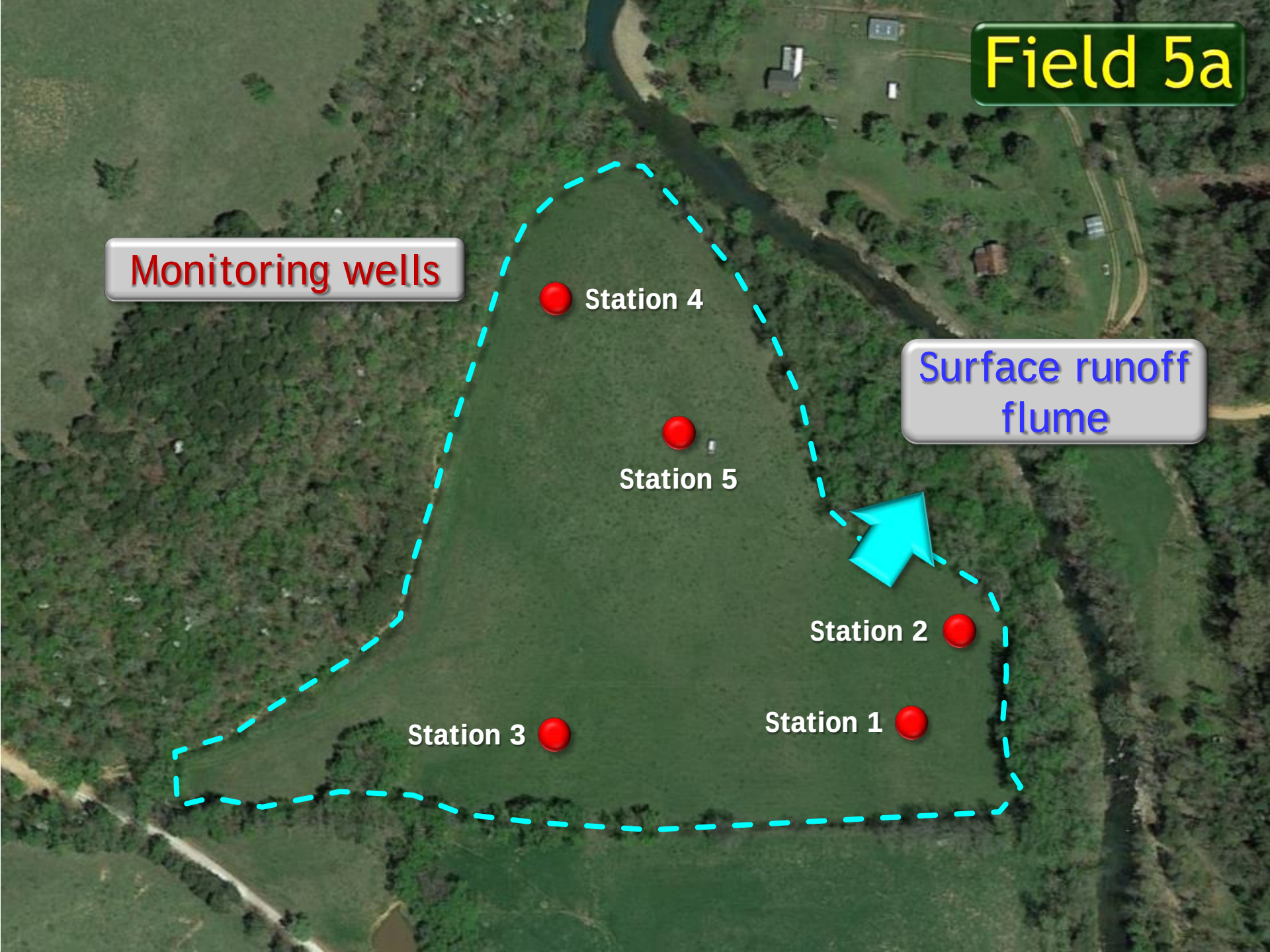
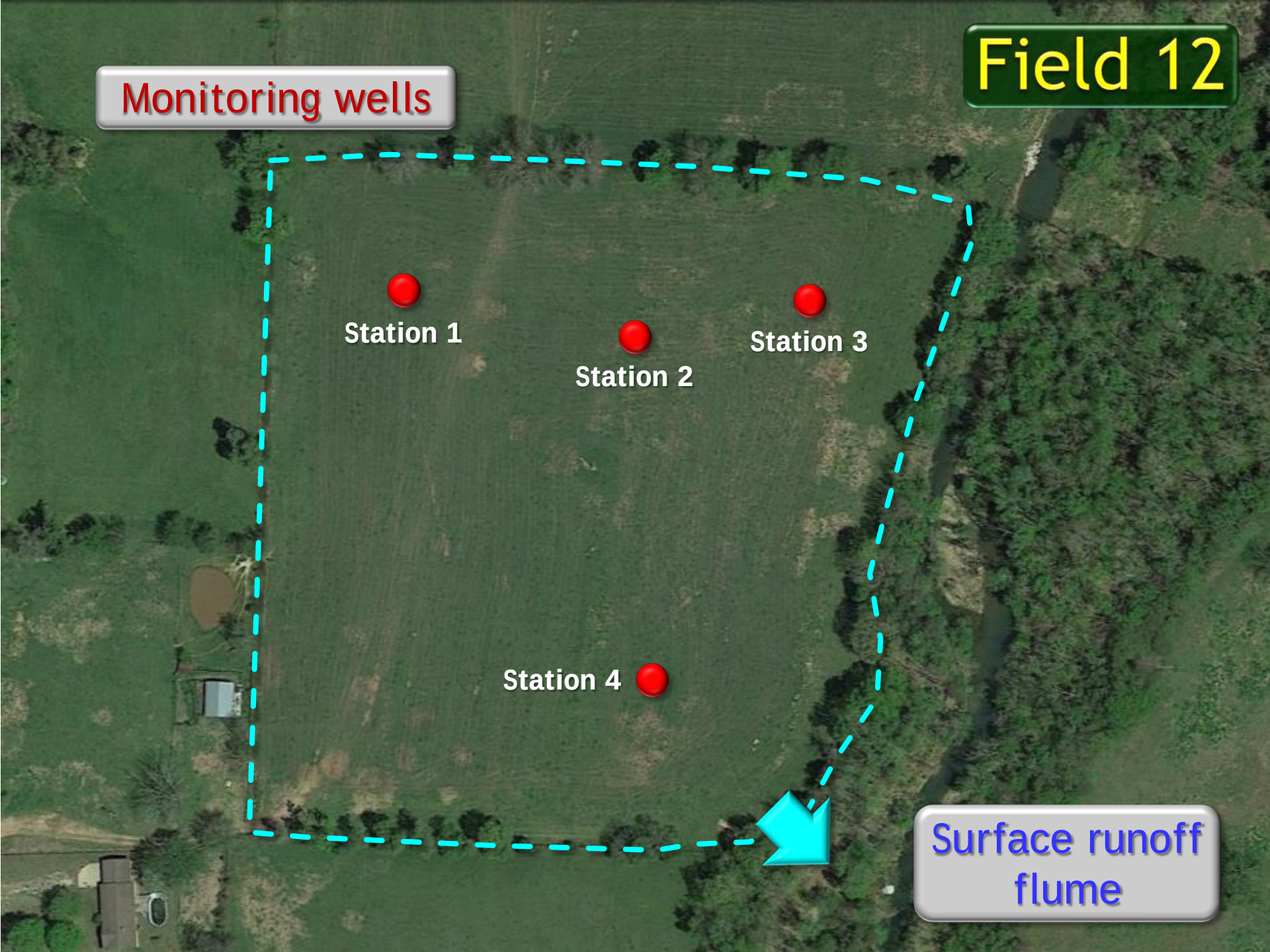

Surface runoff flume
Field 1


Field 5a
Monitoring wells
Station 4
Station 5
Surface runoff flume
Station 2
Station 1
Station 3


Field 12
Monitoring wells
Station 1
Station 2
Station 3
Station 4
Surface runoff flume

What next ?

- Tracers of flow pathways
  - Dyes, natural, elec. resistivity
- Trench & wells near ponds
- Biological status of Big Creek & other watersheds
- Monitor Dry Creek
- Repeat grid-soil sampling
- Continue monitoring water quality

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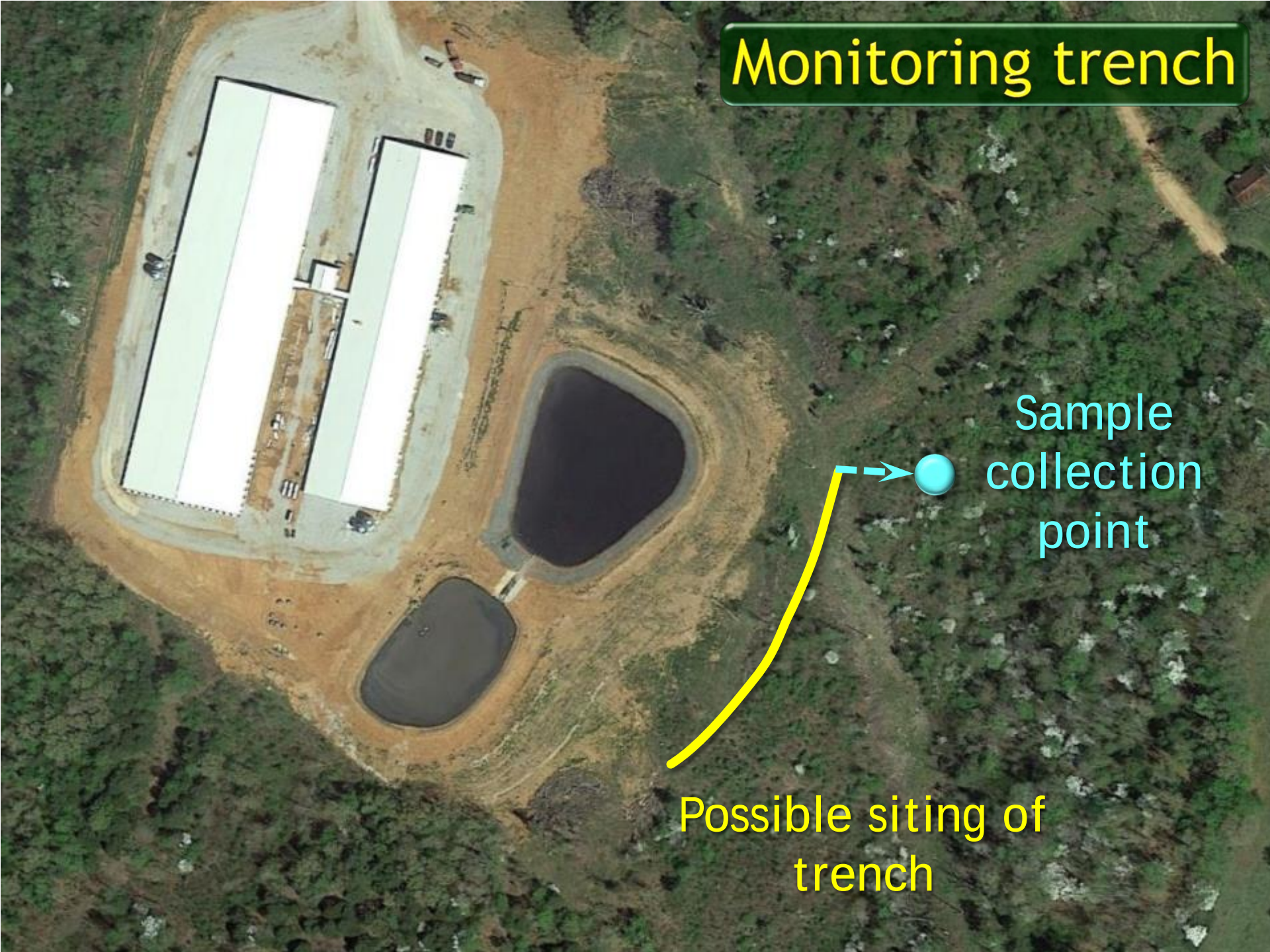
Monitoring trench
Sample collection point
Possible siting of trench

Thank you


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