

The Big Creek Research and Extension Team Project



Our charge

- ✓ Monitor fate and transport of nutrients & bacteria from land-applied slurry
- ✓ Assess impact of farm operations on water quality of springs, streams, & ground water on & adjacent to the farm
- ✓ Monitor long-term accumulation of nutrients in permitted fields



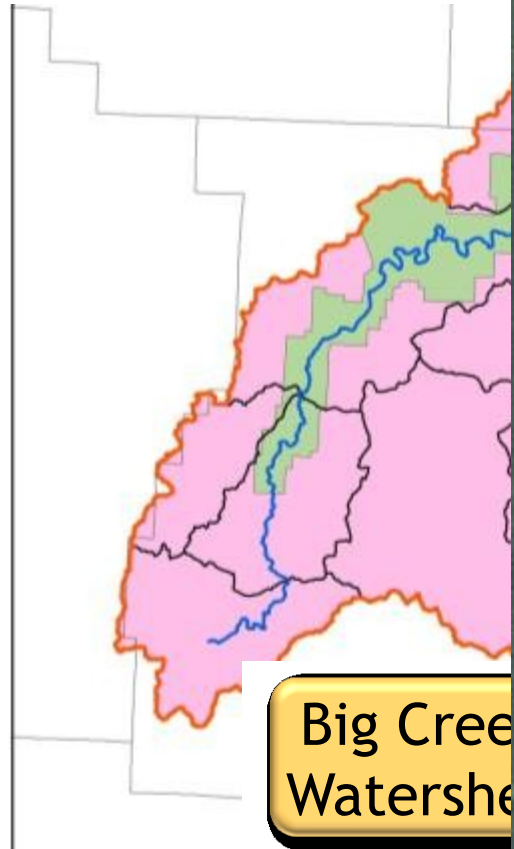
The team

Rick Cartwright	Assoc. Dir. Extension for Agric. & Natural Resources
Kris Brye	Soil physics, pedology, sustainability, nutrient leaching
Mike Daniels	Extension water quality & nutrient mgt. specialist
Brian Haggard	Ecological engineering, water quality monitoring
Tim Kresse (USGS)	Ground and stream water quality
Mary Savin	Structure & function of microbial communities
Karl VanDevender	Extension engineer, manure mgt. & planning
Jun Zhu	Manure treatment technologies, ag. sustainability

Measurements taken

- ✓ Storm & weekly sampling of base flow in Big Creek & springs samples
 - Nutrients, sediment, bacteria
- ✓ Field runoff & leaching sampling on application fields
- ✓ Grid-sample soil nutrients in 3 permitted fields

Buffalo R





Water sampling



Spring



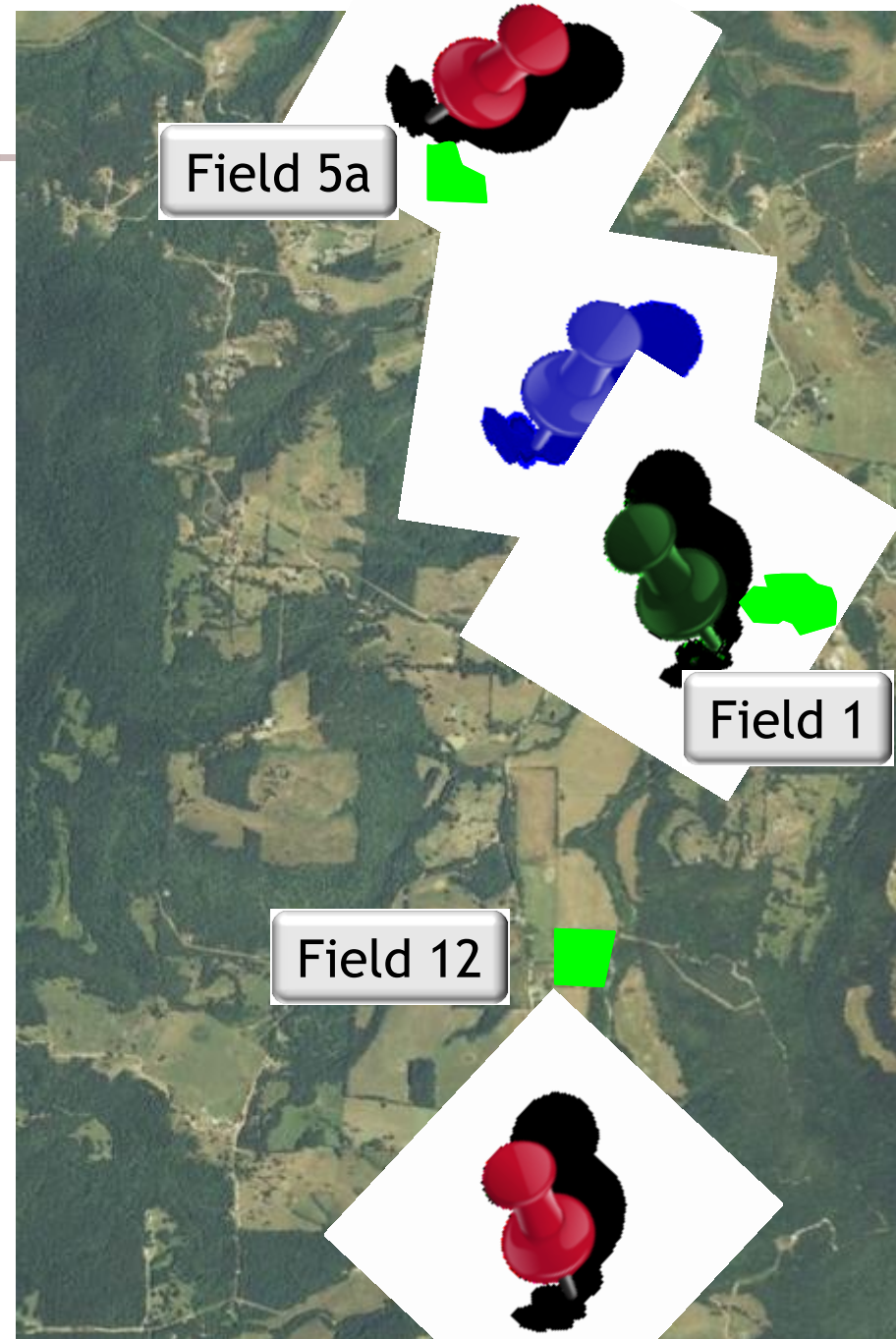
phemeral stream



Big Creek



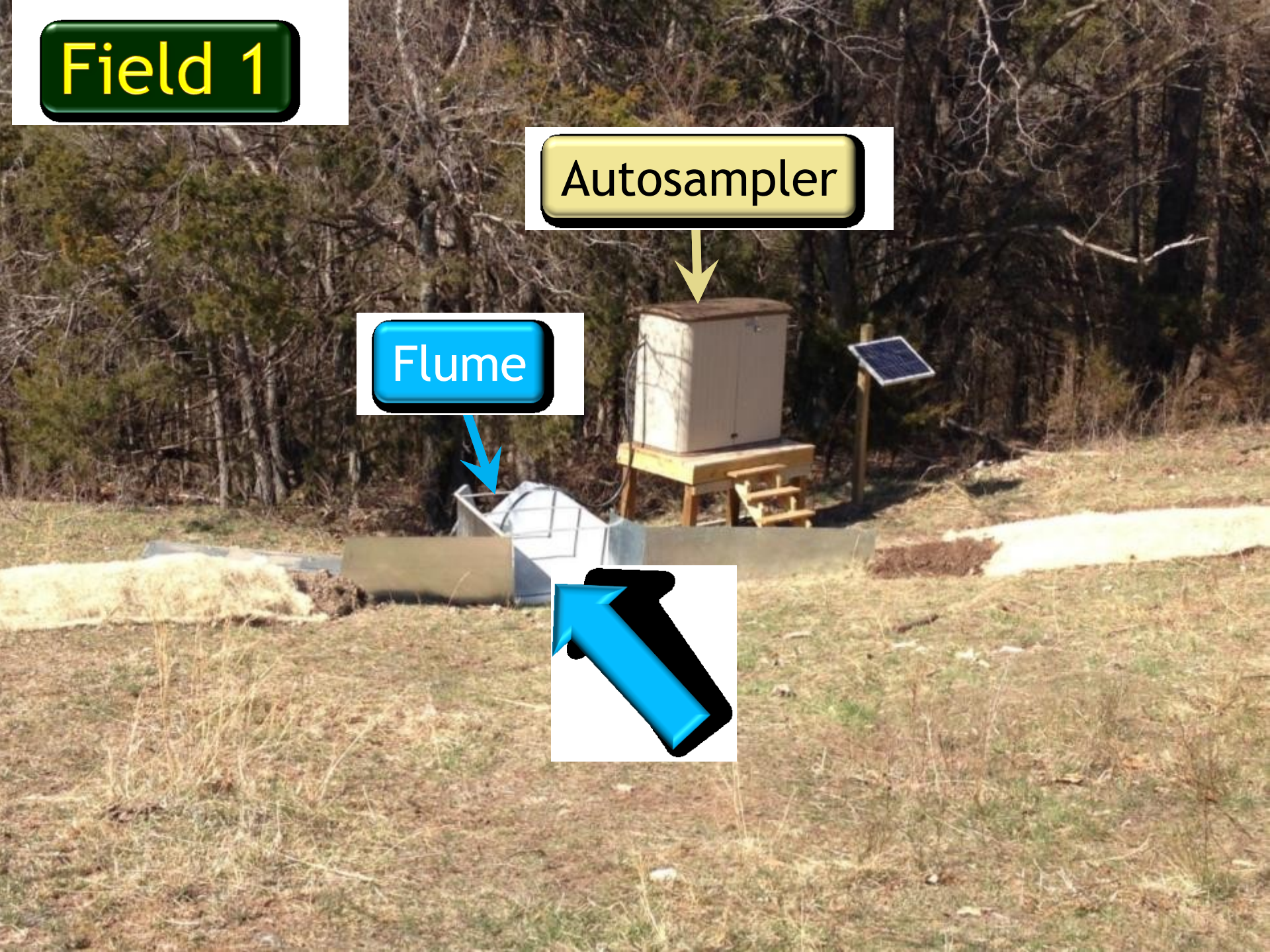
Field runoff sites



Field 1

Autosampler

Flume





Base flow
weekly
grab samples



**USGS gauging
site
downstream
of farm**

**Real time
Stream gauge
Temperature
Rainfall**

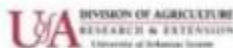


USGS 07055790 Big Creek near Mt. Judea, AR

PROVISIONAL DATA SUBJECT TO REVISION

Available data for this site:

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

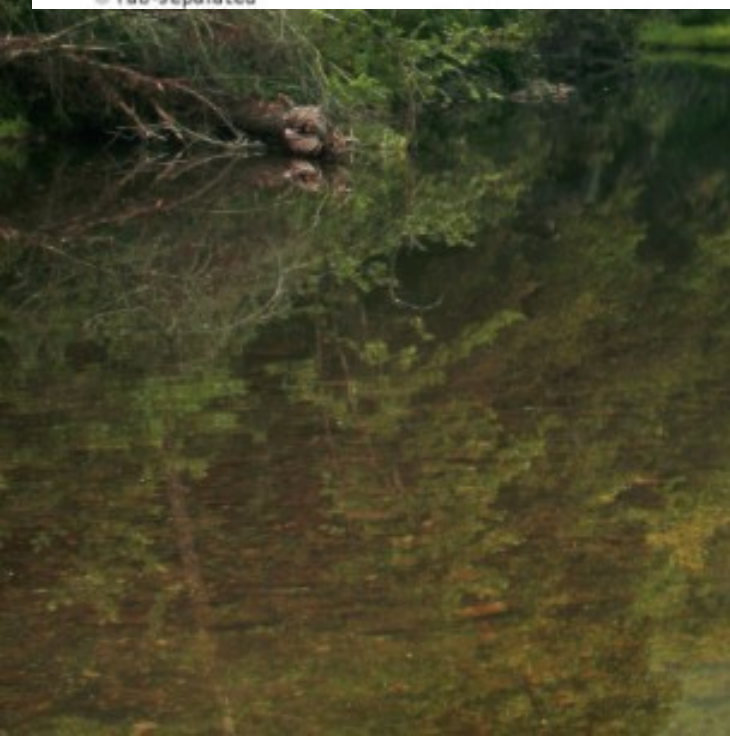
- All 4 Available Parameters for this site
- 00065 Gage height
- 00045 Precipitation
- 00010 Temperature, water
- 00631 NO3+NO2, wf

Available Period

2014-04-22 2014-07-07
2014-04-21 2014-07-07
2014-04-21 2014-07-07
2014-05-22 2014-07-07

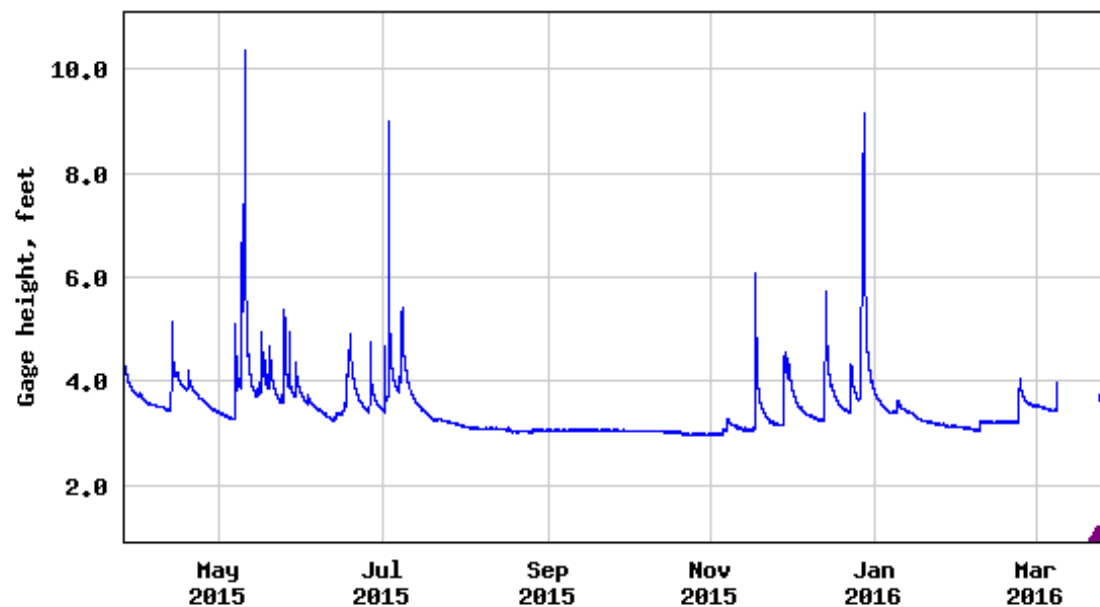
Output format

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



Flow

USGS 07055790 Big Creek near Mt. Judea, AR



----- Provisional Data Subject to Revision -----

— Gage height

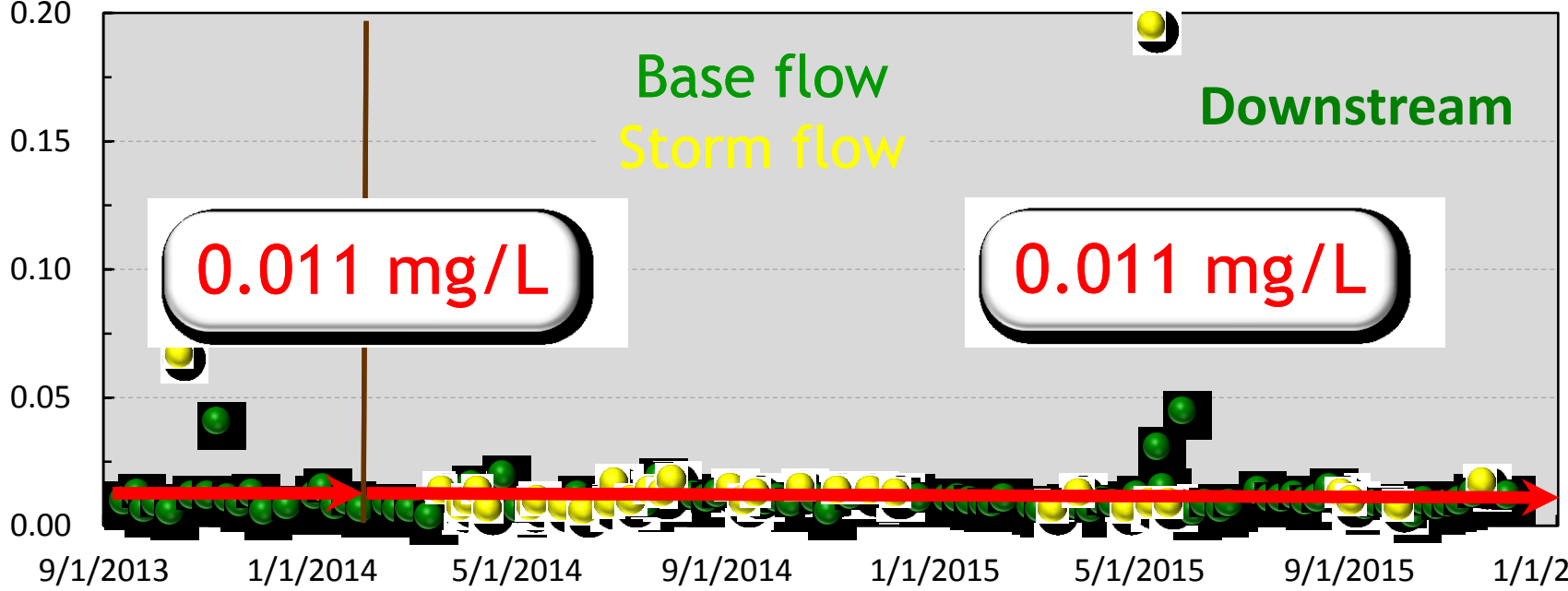
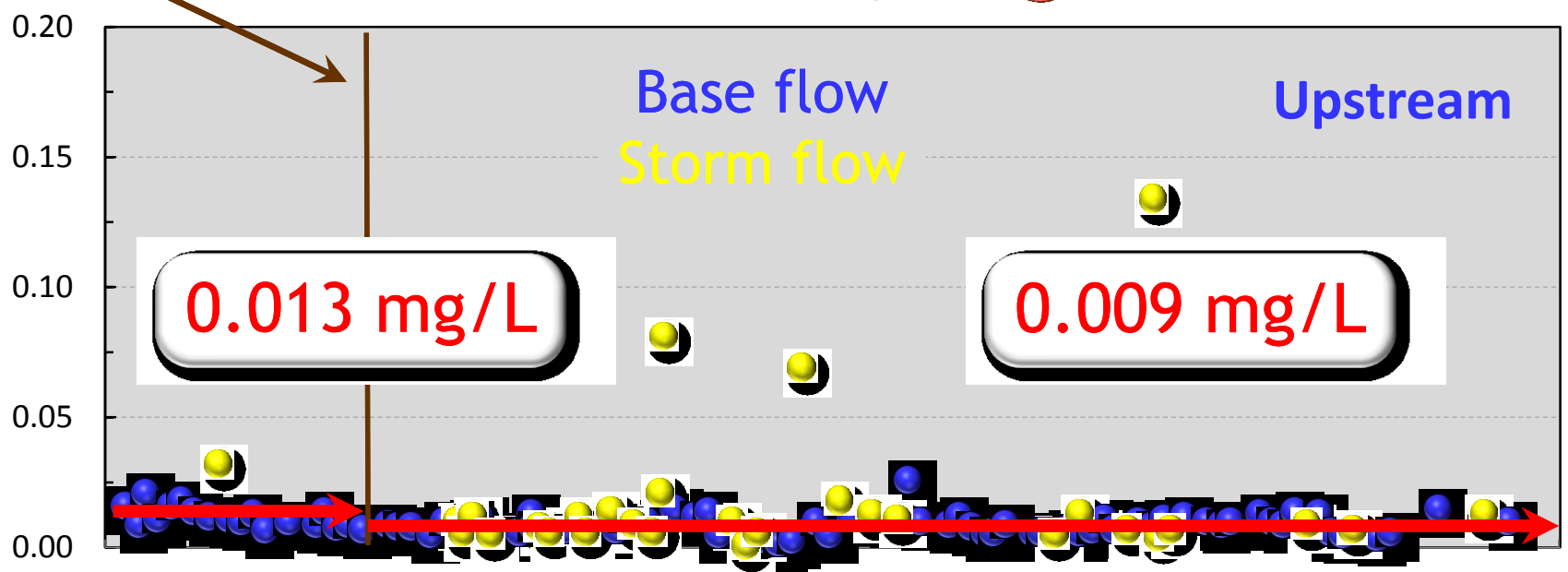
▲ Equipment malfunction

What have we found so far?

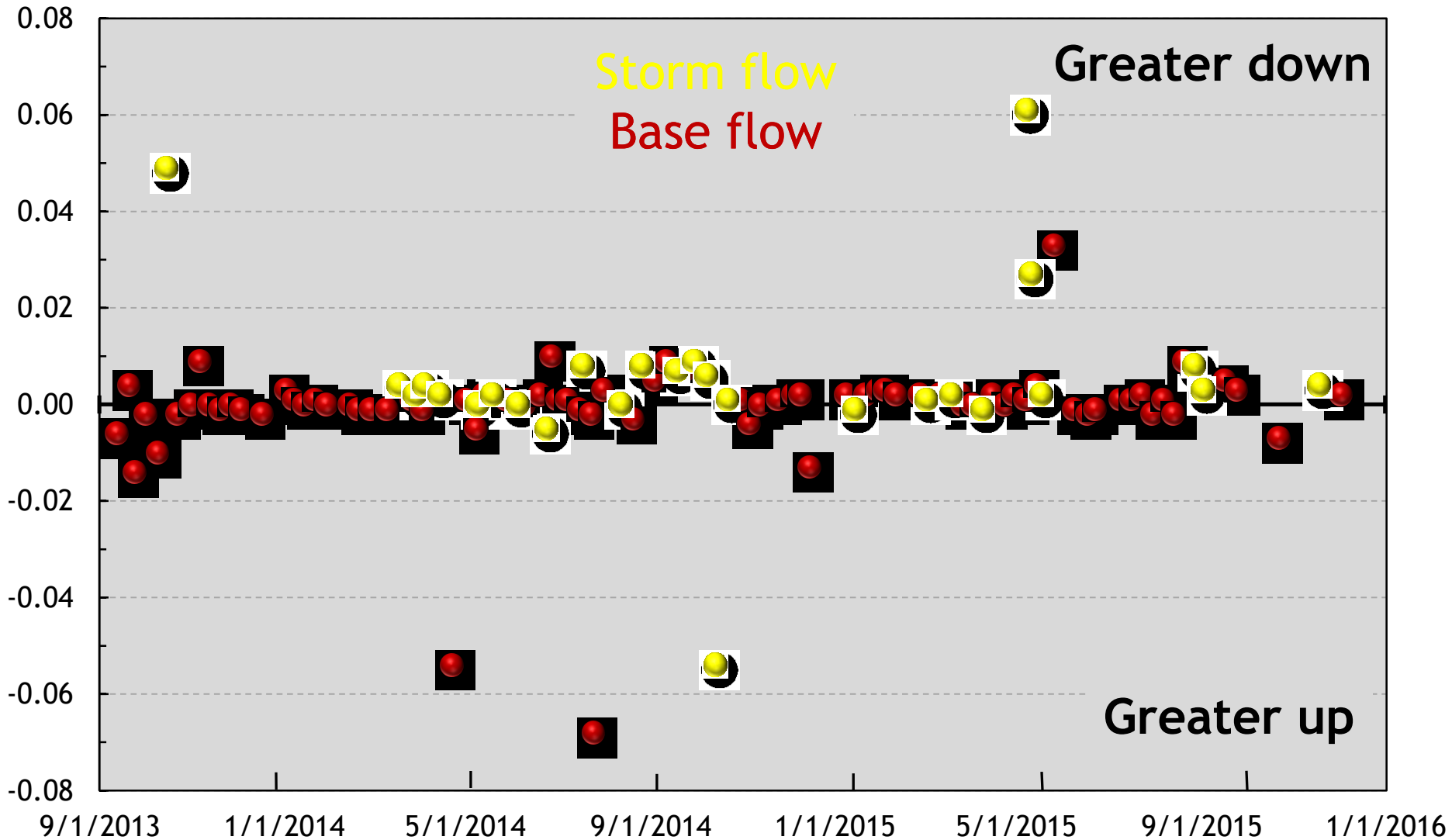


Slurry applications start

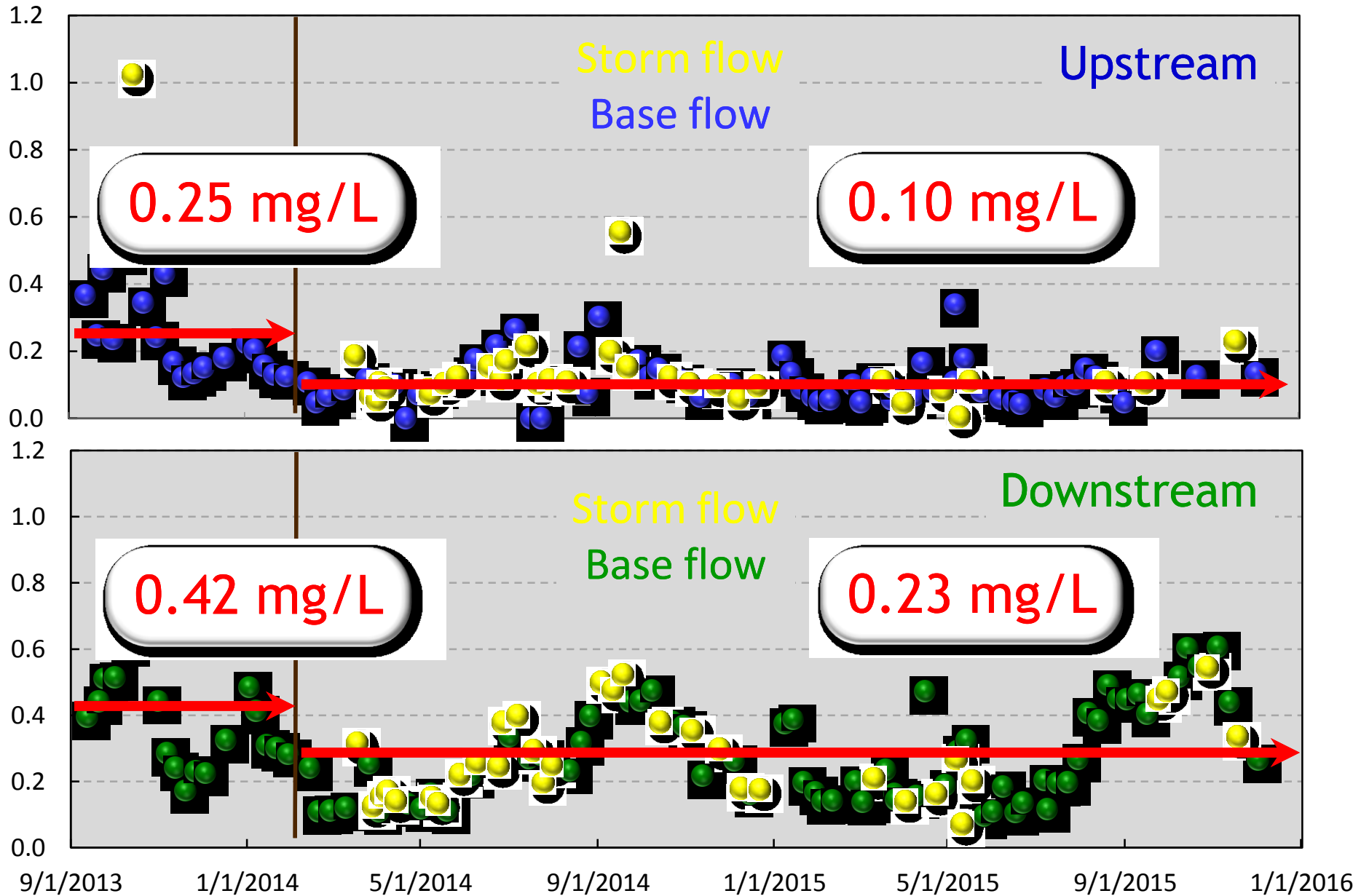
Dissolved P, mg/L



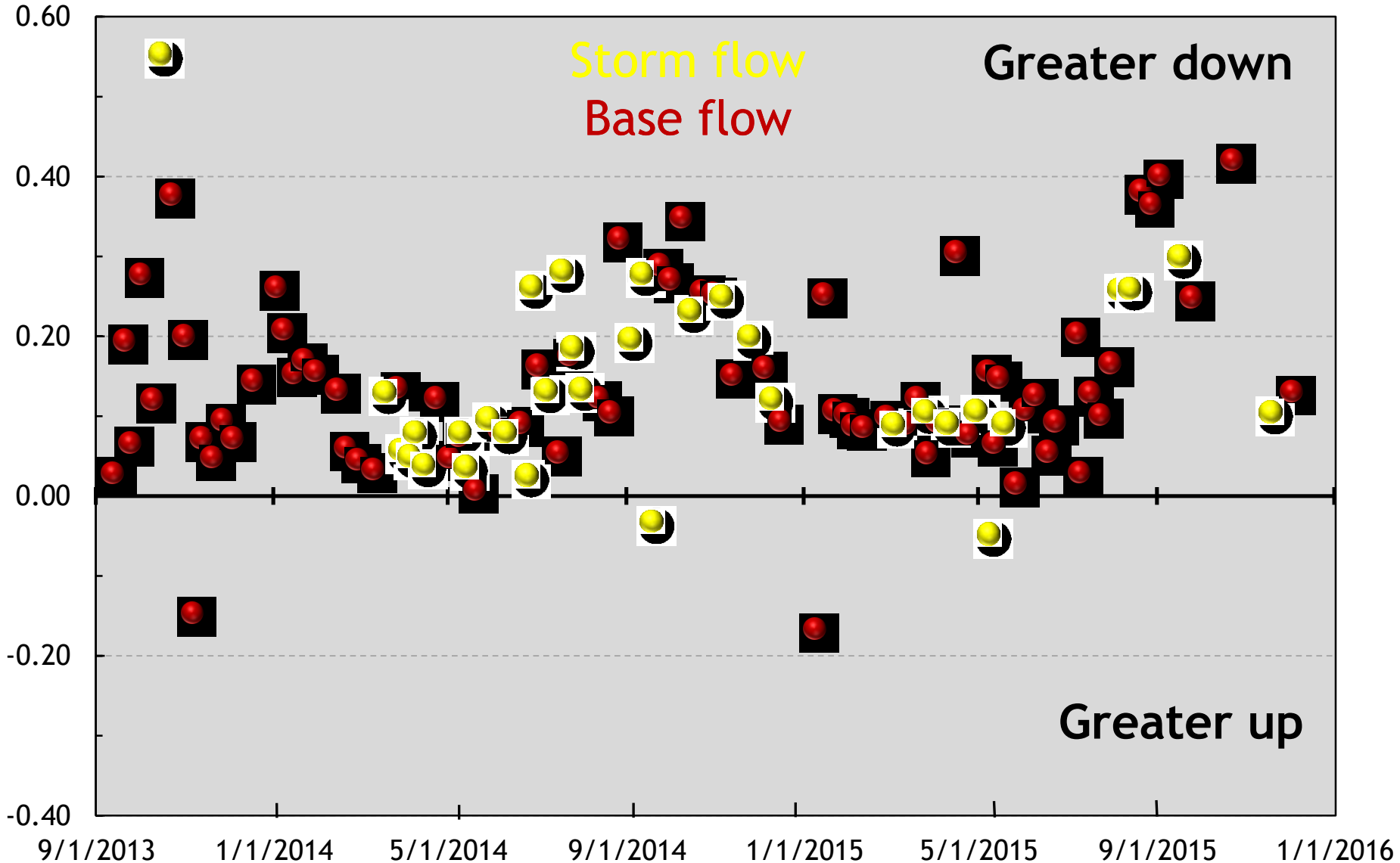
Dissolved P (mg/L) difference between down & upstream sites



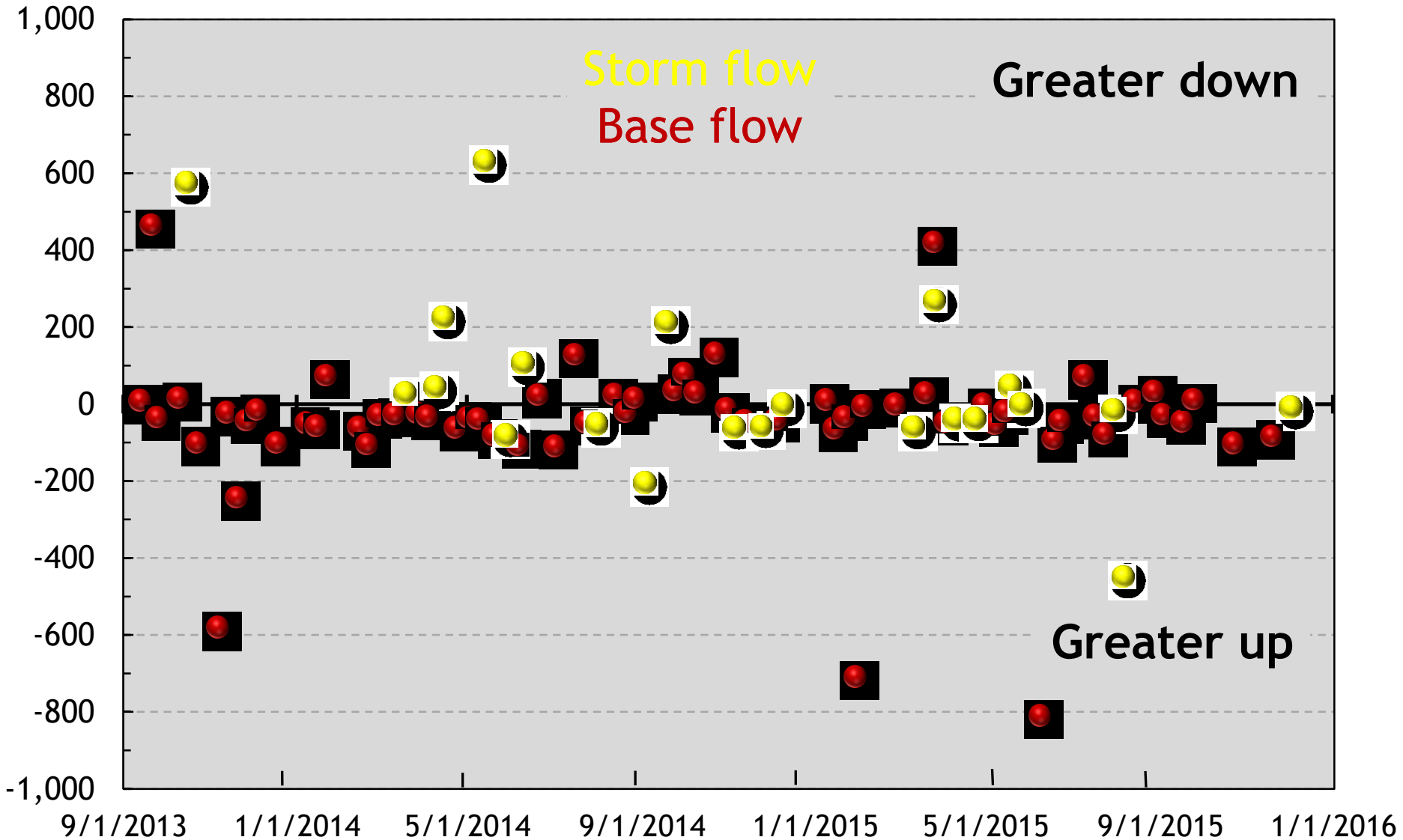
Nitrate-N, mg/L



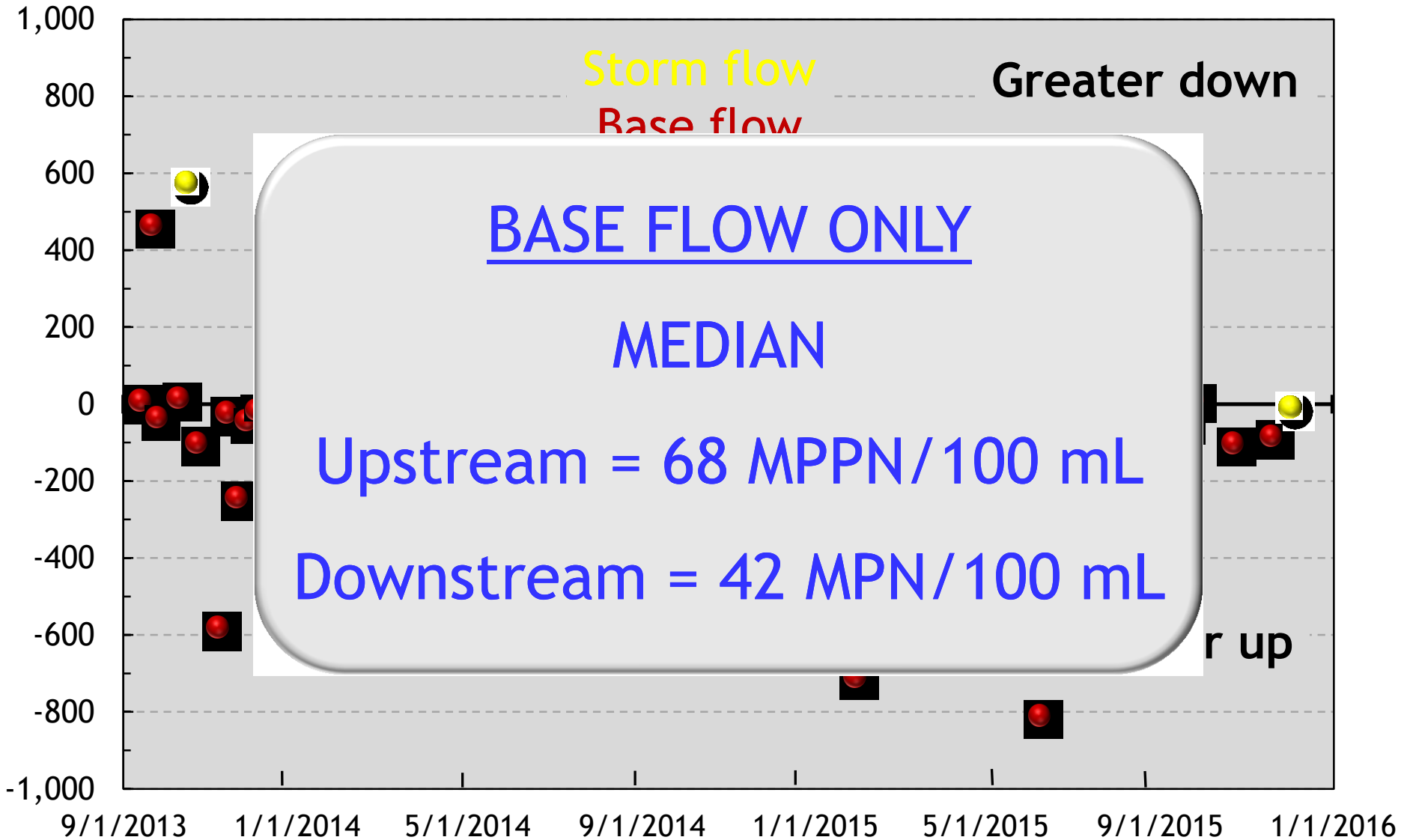
Nitrate-N (mg/L) difference between down & upstream sites



E. coli (MPN/100 mL) difference between down & upstream sites



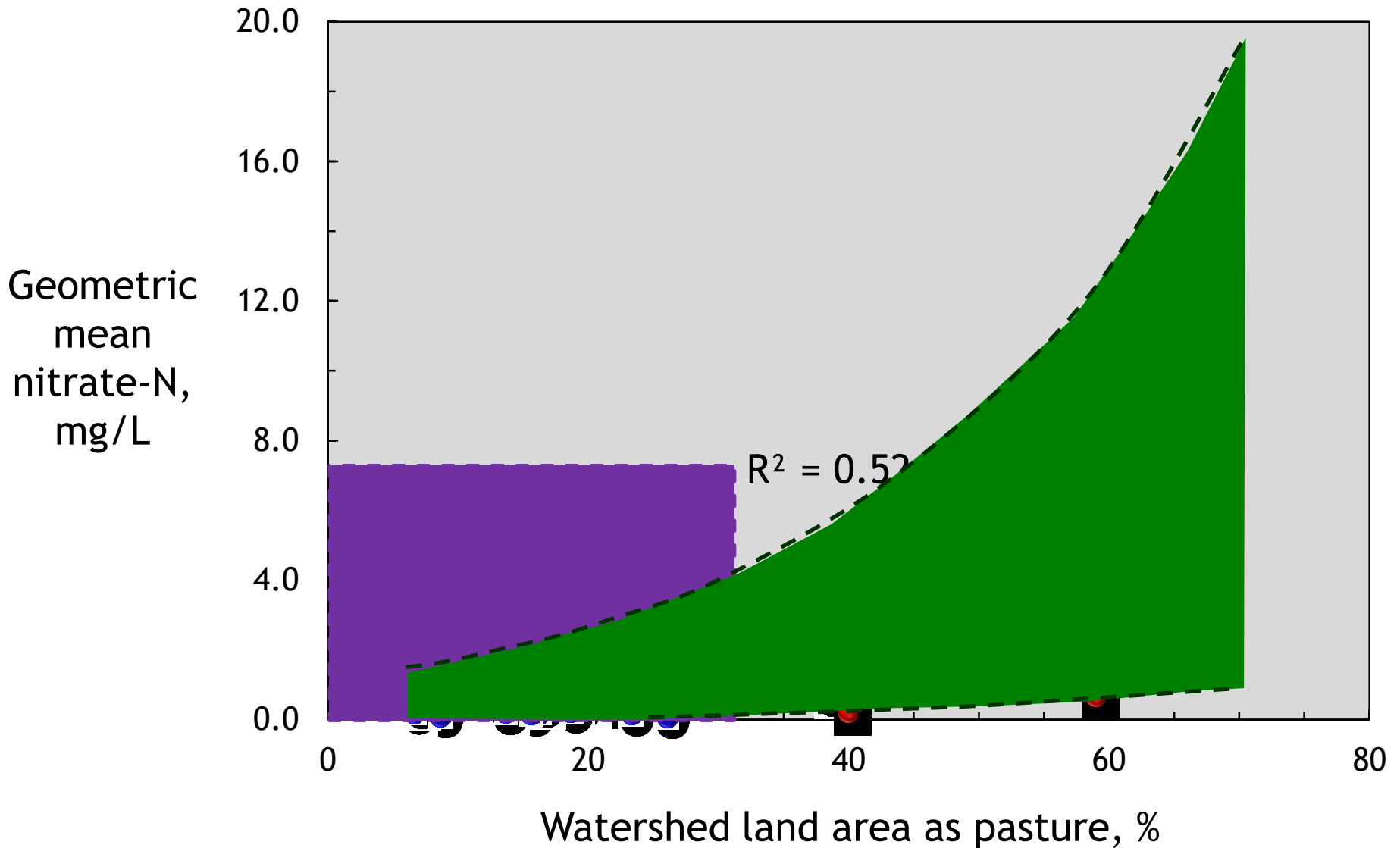
E. coli (MPN/100 mL) difference between down & upstream sites



Putting this into context

Beaver Reservoir Watershed

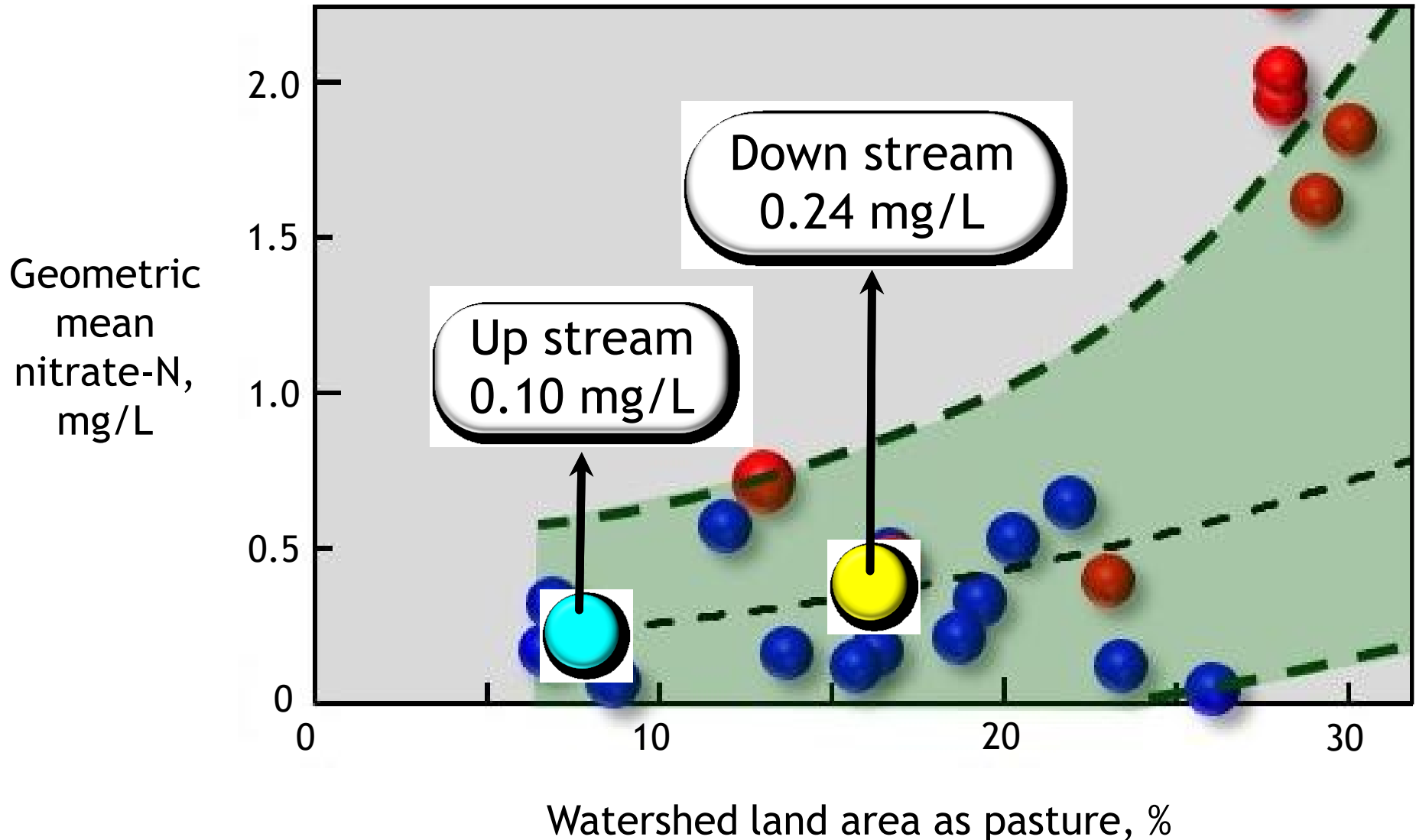
Illinois River Watershed



Putting this into context

Beaver Reservoir Watershed

Illinois River Watershed



Findings to date

- ✓ No consistent trends to date
- ✓ System variability creates uncertainty
- ✓ Transparency is critical
- ✓ <http://www.bigcreekresearch.org/>
- ✓ Quarterly reports provided to ADEQ & Governor's Office
- ✓ Monitoring over least 5 years is recommended

Thank you

Big Creek

With permission:
Barbara Hinton,
Prof. Emeritus, U of A

