

# Water Quality and Fecal Coliform Monitoring on Big Cedar Creek, a 303d Listed Stream

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# Cooperators



- Putnam County Board of Commissioners
- University of Georgia
- Putnam, Baldwin, and Jones County Cooperative Extension Services

# Agenda

- Objectives
- State Standards and TMDLs
- Big Cedar Creek Description
- Monitoring Design
- Results
- Conclusions



# Objectives

- Determine if Big Cedar Creek meets Georgia water quality standards for:
  - Fecal coliform
  - Dissolved oxygen
  - pH
- Assess potential sources of fecal coliform
- Evaluate stream phosphorus to estimate the extent of agricultural sources





# TMDLs

- Georgia EPD has designated 11 miles as needing TMDLs for fecal coliform and dissolved oxygen (DO)
  - Hog Creek to Lake Sinclair
- TMDLs have been proposed for DO
- TMDLs for fecal coliform would be allocated to:
  - agricultural (80%)
  - urban areas (20%)
- Fecal coliform from wildlife was not considered in this allocation process



# Georgia EPD Fecal Coliform Standard for Water Contact Activities

- Geometric mean (GM)
  - $GM = (Y_1 * Y_2 * Y_3 * Y_4)^{1/4}$
  - At least 4 samples
  - Over a 30-day period
  - At least 24 hours apart



# Fecal Coliform Standards...cont.

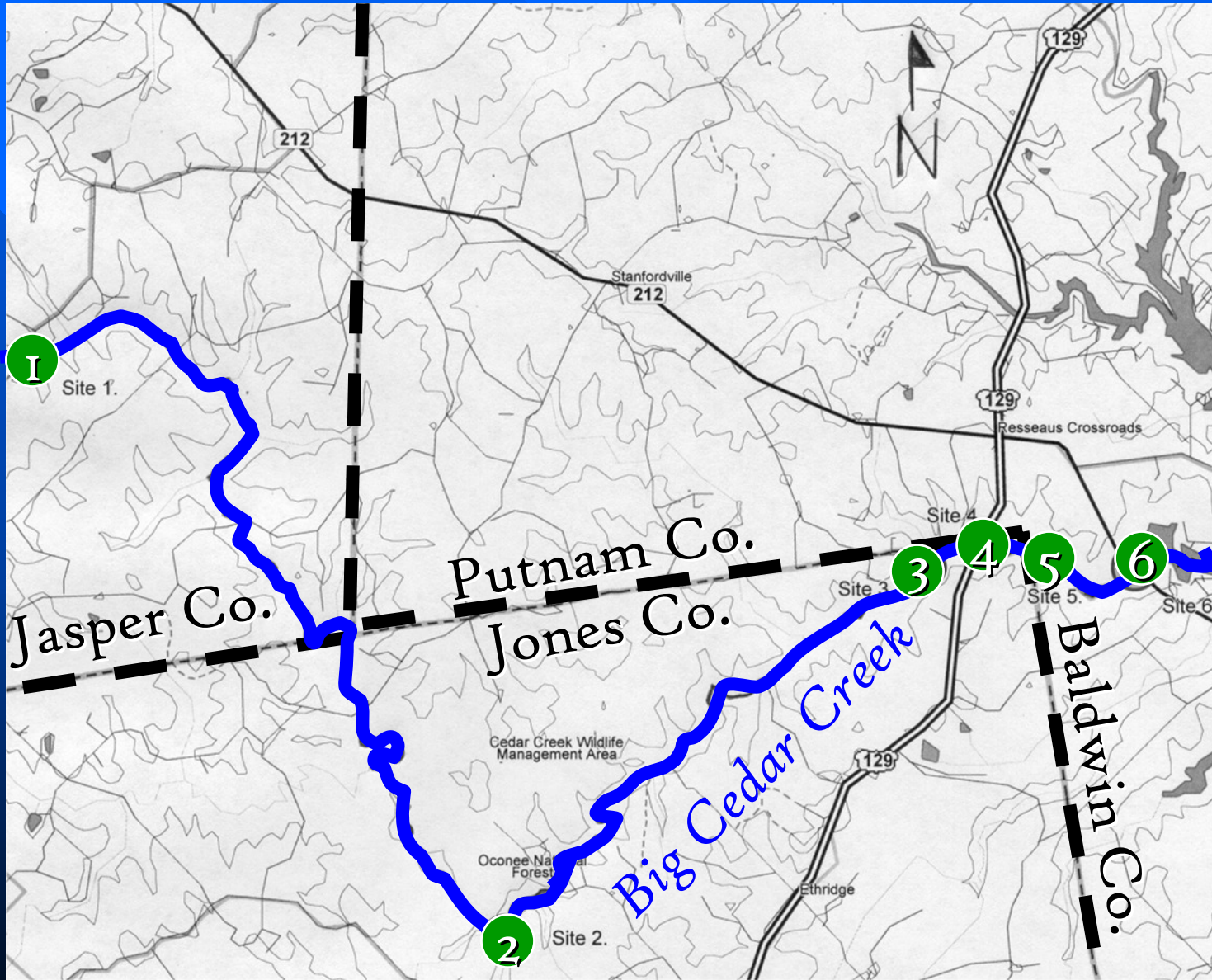
- May thru October
  - GM not to exceed 200 MPN/100-ml
  - No individual samples exceeding 4,000 MPN/100-ml
- If studies show that fecal coliform from **Non-human** sources occasionally exceeds 200 MPN/100ml, the allowable geometric mean shall not exceed:
  - 300 MPN/100-ml in lakes and reservoirs
  - 500 MPN/100-ml in flowing streams



# Fecal Coliform Standards...cont.

- November thru April
  - GM not exceeding 1,000 MPN/100-ml
  - No individual sample exceeding 4,000 MPN/100-ml







**Site 1**



**Site 2**



**Site 3**



**Site 4**



**Site 5**



**Site 6**



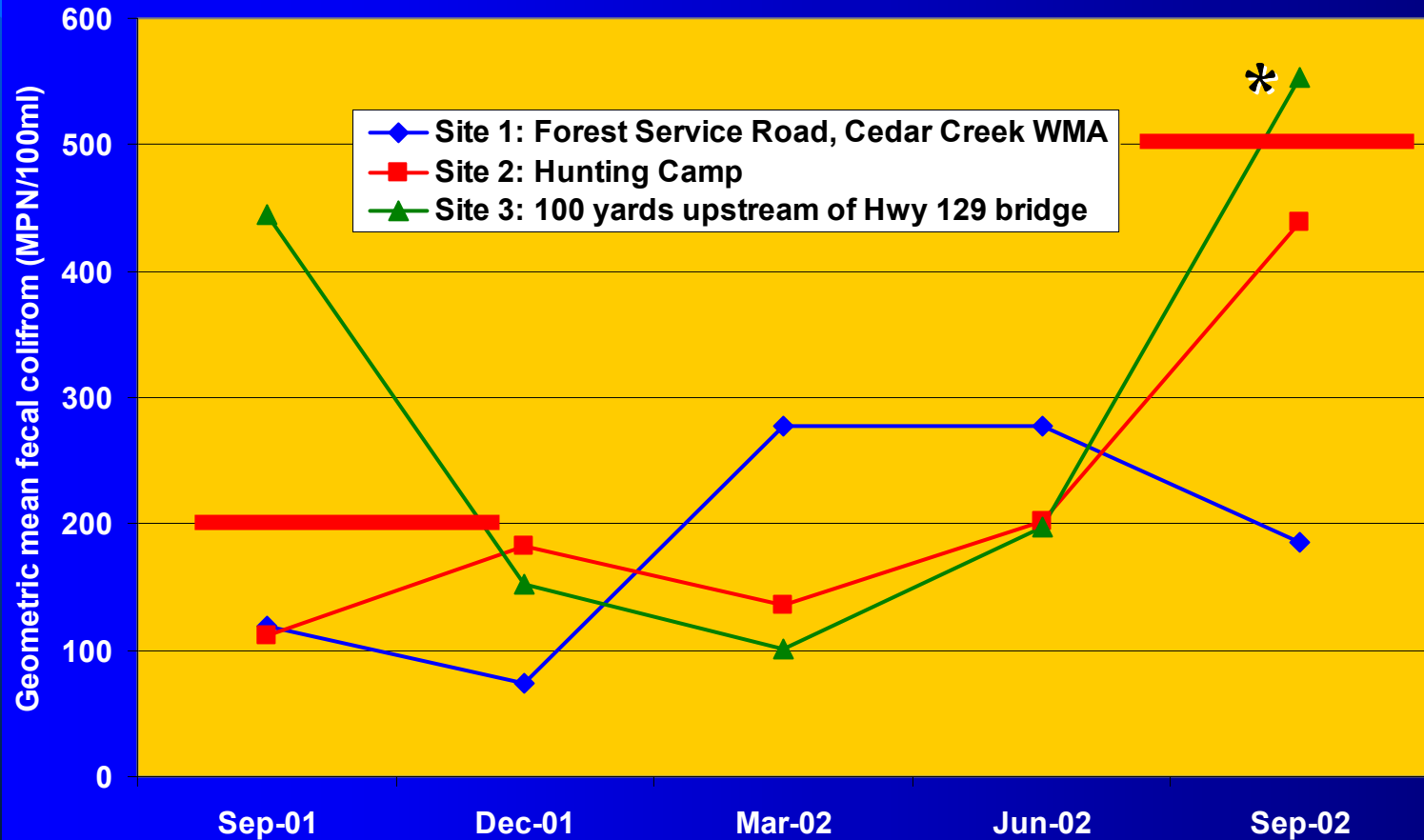
# Animal Density DNR Wildlife Survey

- Whitetail deer.....50-60/mile<sup>2</sup>
- Wild Turkey.....15-20/mile<sup>2</sup>
- Water Fowl.....above average
- Small mammals in riparian zones.....high

# Cedar Creek



## Geometric Mean Fecal Coliform

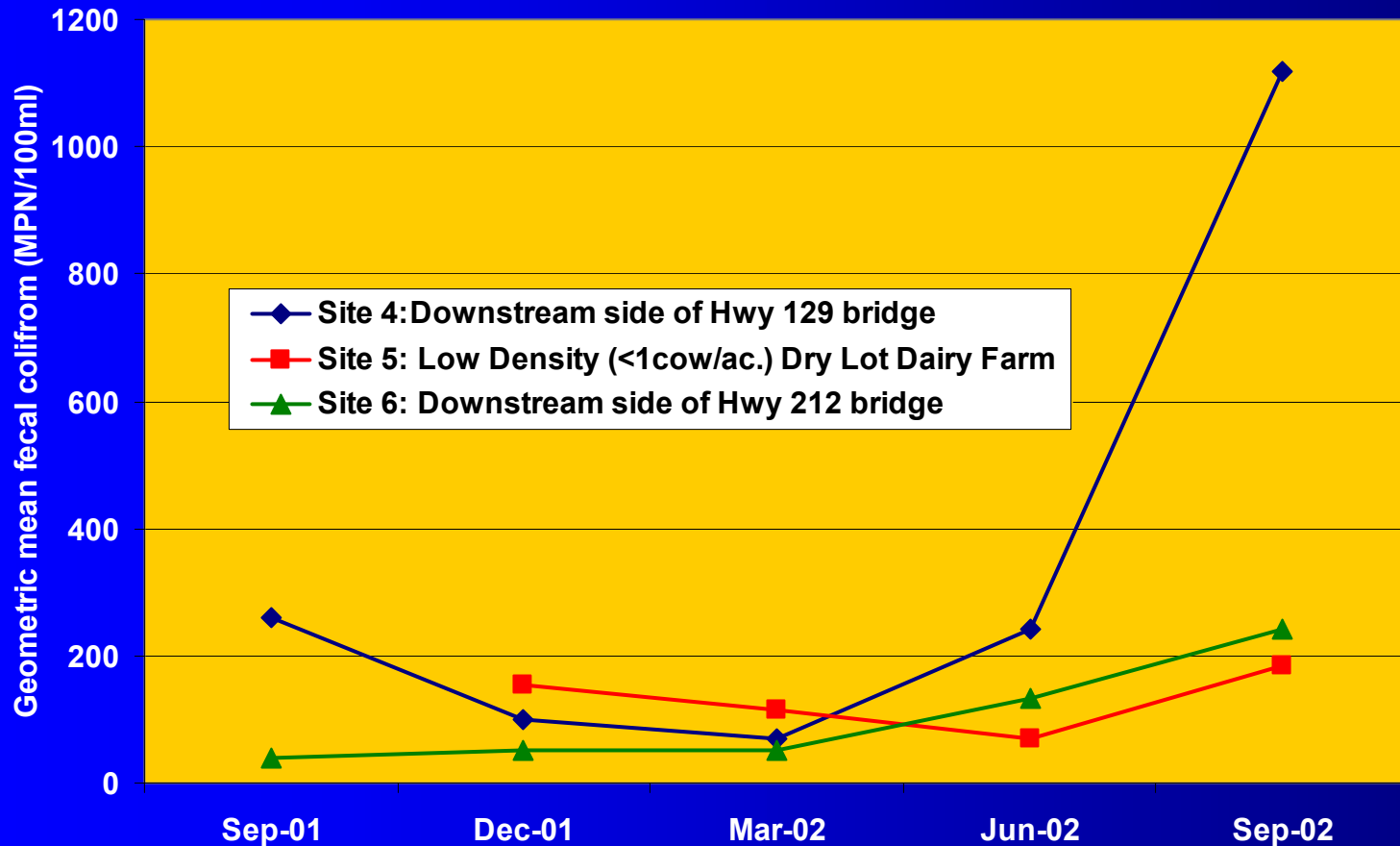


\*One value >4000 MPN/100ml in September 2002

# Cedar Creek



## Geometric Mean Fecal Coliform



# Dissolved Oxygen and pH

- DO Criteria.....>6.0 mg/L
  - Sites 1, 2, & 3 all above criteria during entire study
  - Sites 4, 5, & 6 above criteria except during low flow of June and September of 2002
  - High temperature and low flow
- pH Criteria.....6.0 to 8.5
  - All within criteria

# Phosphorus

- All phosphorus values were low
  - $<0.06$  mg/l
- This indicates that this watershed has minimal impact from domestic animal manure or other agricultural phosphorus sources

# Conclusions

- The fecal coliform criteria of 200 MPN/100 ml were exceeded in areas without agricultural or urban sources. Therefore, wildlife sources caused the stream impairment (greater than 4000 MPN/100 ml) based to current standards.
- Since these are non-human sources the alternative criteria are recommended:
  - 300 MPN/100 ml for lakes and reservoirs or
  - 500 MPN/100 ml for flowing streams.



## Conclusions....cont.

- Dissolved oxygen violations were likely due to low flows and high water temperatures caused by the long term drought in the Southeast.
- Phosphorus levels indicate that this watershed has minimal impact from domestic animal manure or other agricultural phosphorus sources

# Other Related Work

- Glady Creek
  - More intensively sampled a split of 14 sites located to intercept canalized runoff from:
    - » agricultural areas
    - » wildlife management areas (WMA)
- Preliminary comparisons showed WMAs have higher fecal coliform levels than agricultural areas