The Role of Ponds in Reducing the Threat of Pathogen Contamination from Livestock in Agricultural Watersheds

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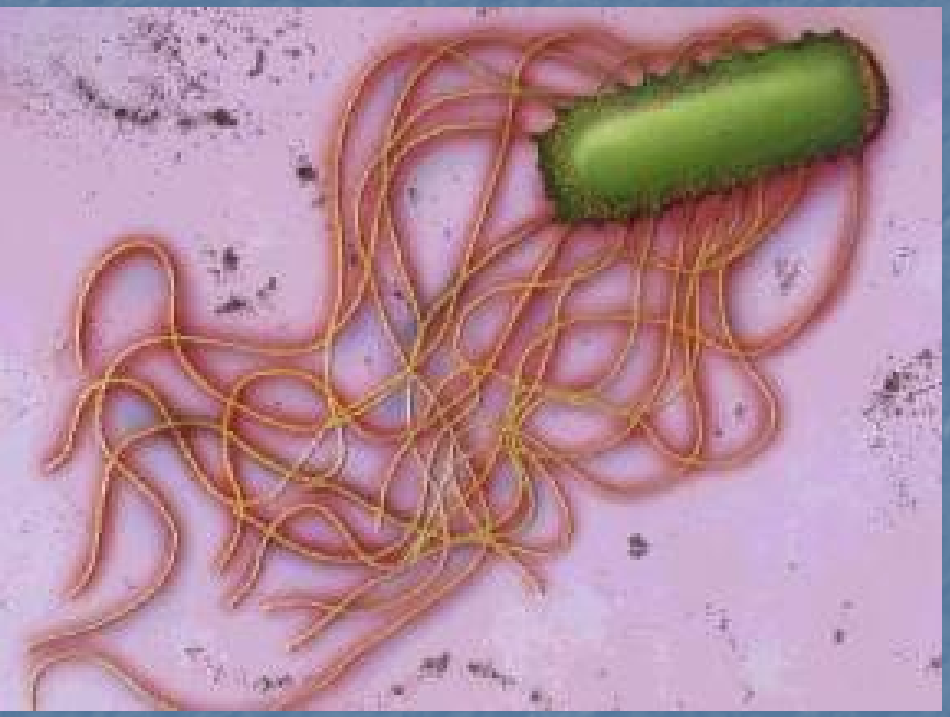
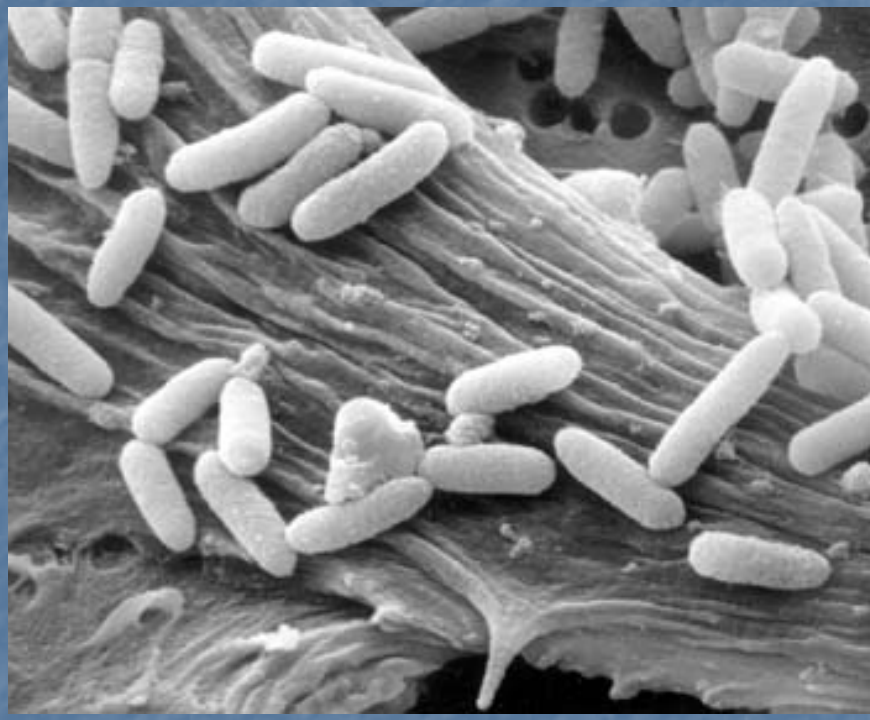
Animal Agriculture

- Non point source for contamination of drinking and recreational waters
- Waste from animal agriculture contains bacterial, viral, and protozoan pathogens
- Land applied as fertilizer
- Documented as source of surface water contamination of pathogenic microorganisms

Bacterial Pathogens



Salmonella



***E. Coli* 0157:H7**

Main Hypothesis

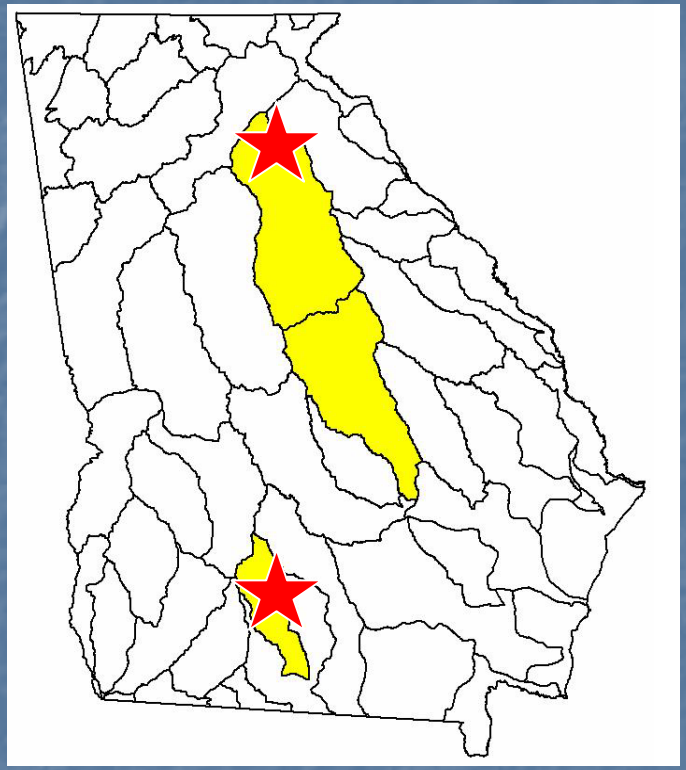
- Ponds downstream from a source of fecal pollution can be used for reducing fecal indicator bacteria, *E. coli* and fecal enterococci, and pathogen contamination (*Salmonella* and *E. coli* 0157:H7) of surface waters below ponds

Attenuation Mechanisms in Surface Water

- Solar radiation
- Temperature
- Nutrient concentration (% DOC)
- Biological activity (predation)
- Attachment to particles
- Sedimentation
- Resident time

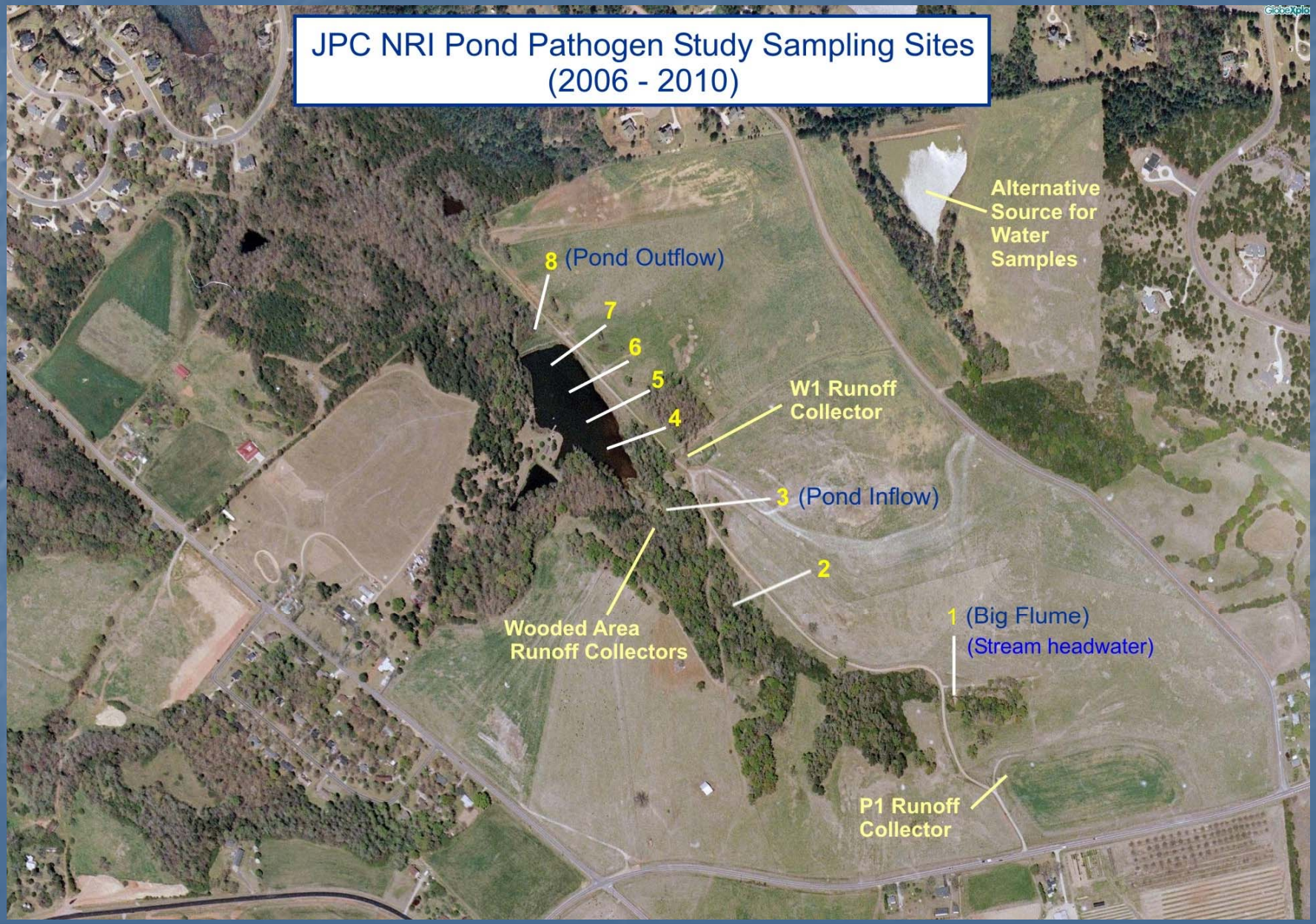
Two Field Sites in Georgia

- Bishop Pond: Southern Piedmont Site – USDA-ARS. J. Phil Campbell, Sr. Natural Resource Conservation Center Watkinsville, GA
- Upper Oconee River Basin



- University of Georgia Animal and Dairy Science (ADS) Farm, Tifton, GA
- Little River Watershed

Bishop Pond


JPC NRI Pond Pathogen Study Sampling Sites
(2006 - 2010)
Alternative Source for Water Samples
8 (Pond Outflow)
7
6
5
4
W1 Runoff Collector
3 (Pond Inflow)
2
Wooded Area Runoff Collectors
1 (Big Flume)
(Stream headwater)
P1 Runoff Collector

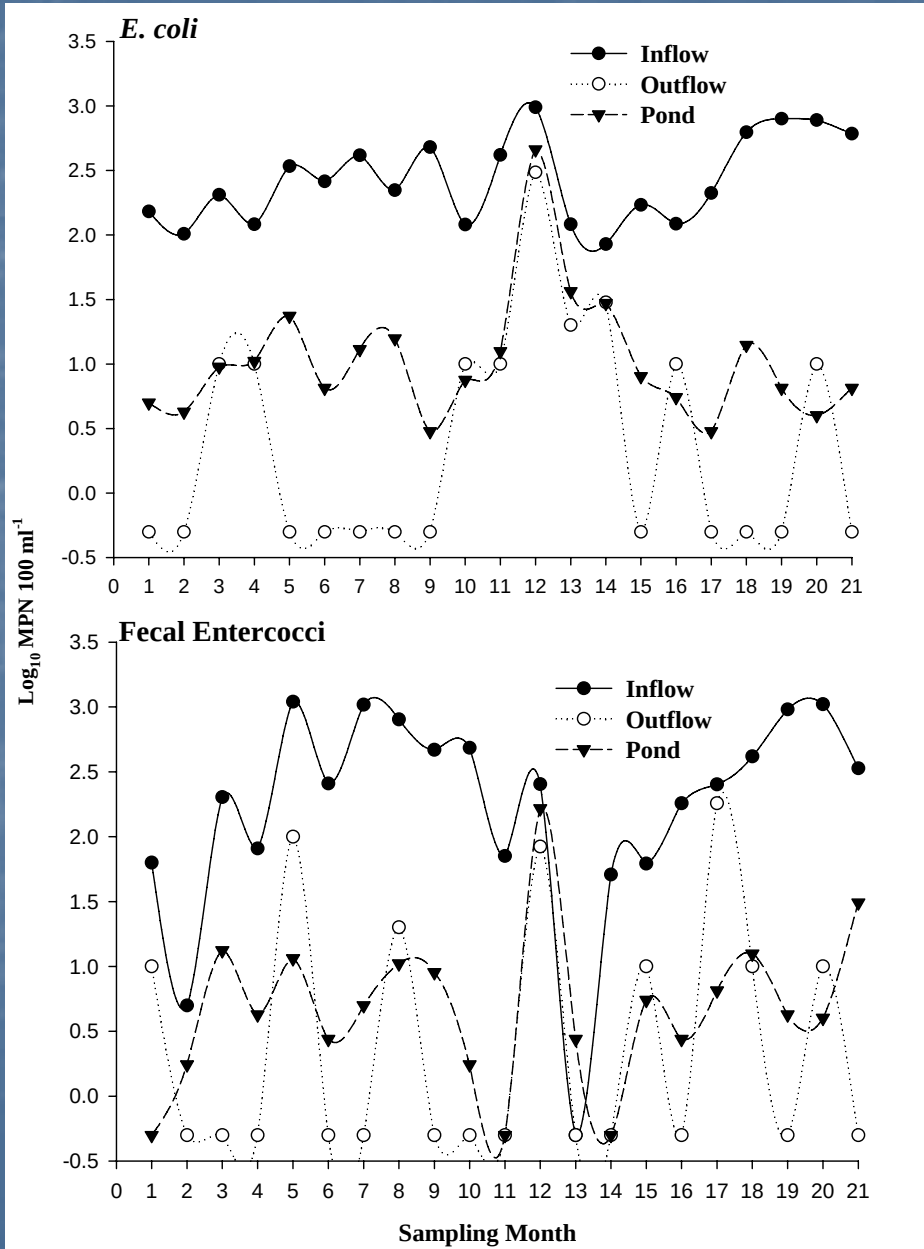
Inflow Site

Pond Sampling

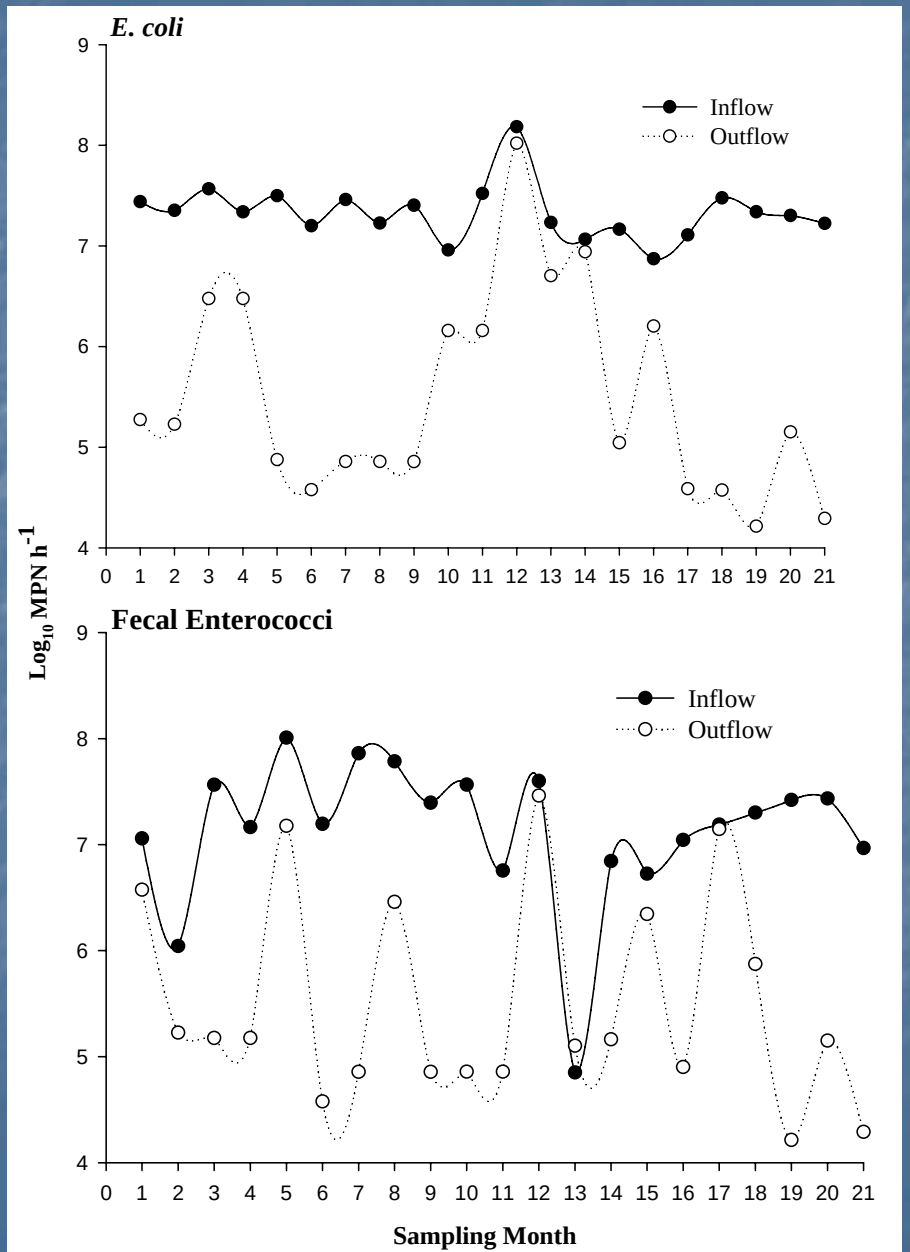
Outflow

Ponds at UGA Tifton Farm

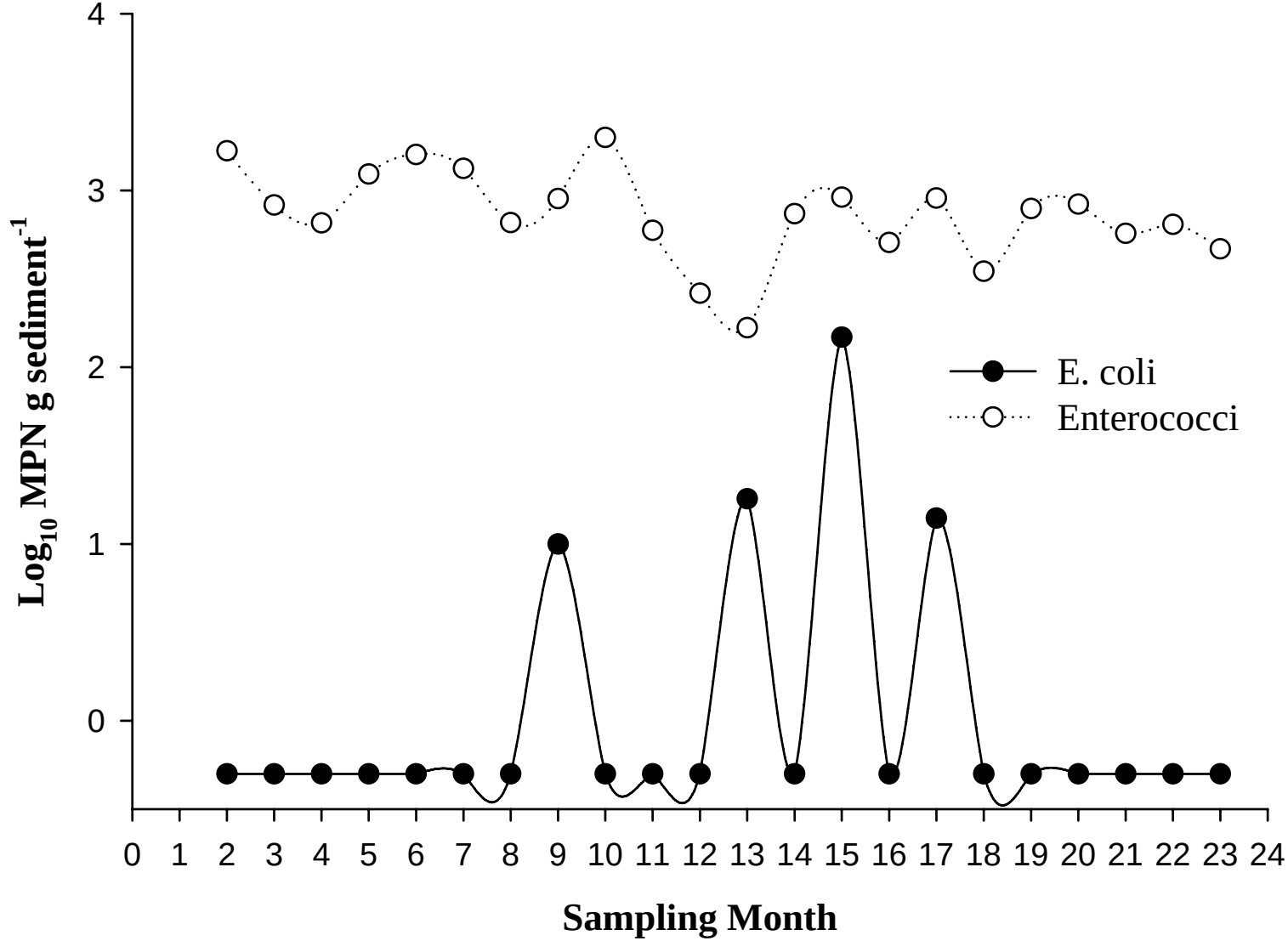
Concentrations of Fecal Indicators



Flux of Fecal Indicators



Fecal Indicators in Pond Sediment



Summary Remarks

- Bishop Pond significantly reduces outflow concentrations of fecal indicator bacteria compared to inflow concentrations
- Concentrations of fecal enterococci were consistently greater than *E. coli* which in most cases were below detection limits
- For data on *Salmonella* and *E. coli* 0157:H7 visit our poster.