

Water Quality on California Rangeland Watersheds

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Urban-Wildland-Agricultural Interface



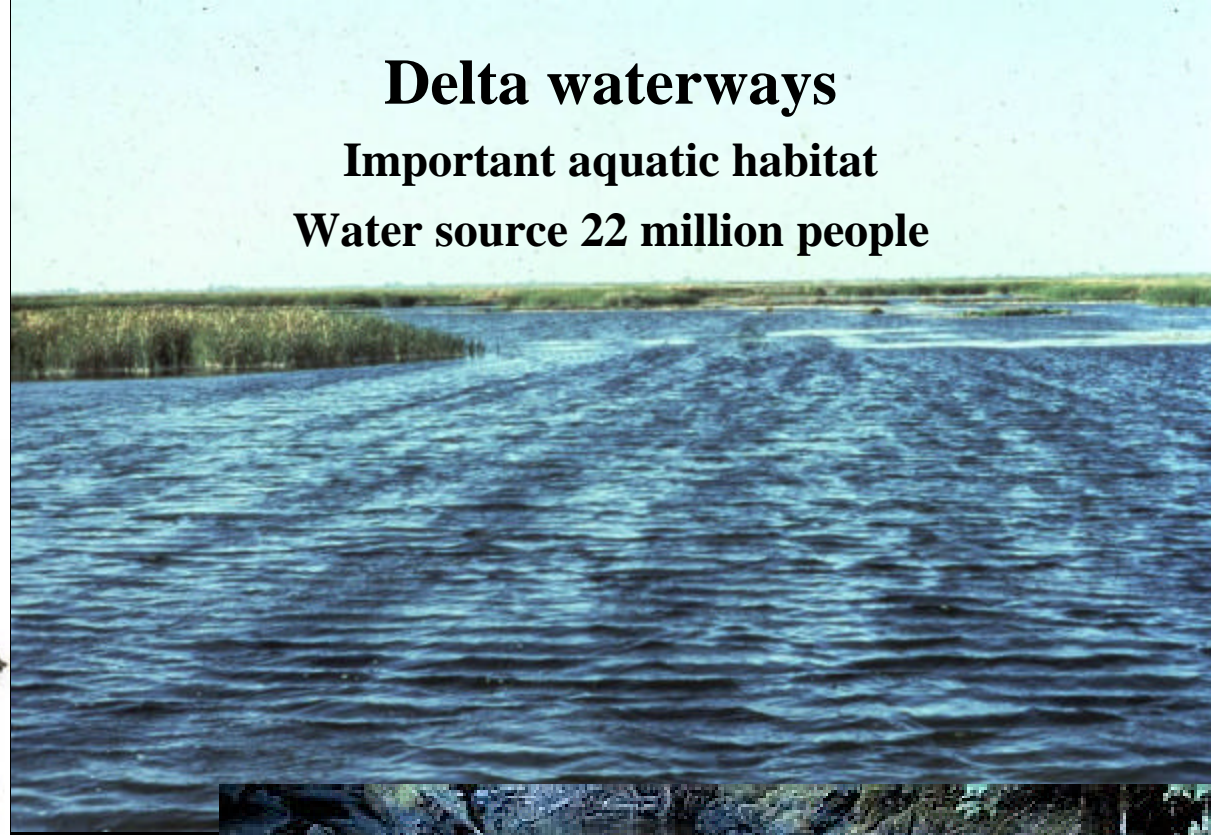
80% of Reservoirs



Delta waterways

Important aquatic habitat

Water source 22 million people



Vegetation Management

- **Maintain economically feasible agricultural enterprises**
- **Maintain open space**
- **Reduce fuel loads**
- **Improve habitat**
- **Manage weed infestations**

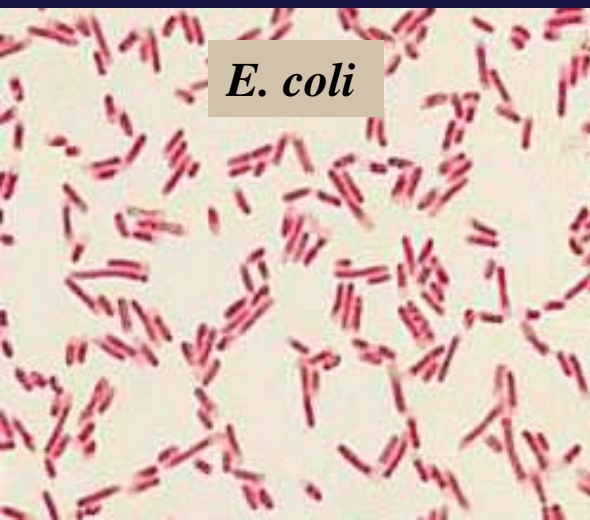
Grazing and prescribed fire



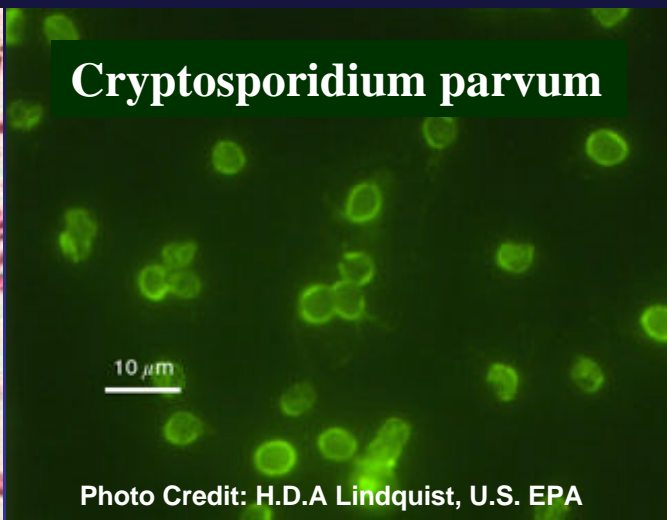


Nutrients

Pathogens



E. coli



Cryptosporidium parvum

10 μm

Sediments

Photo Credit: H.D.A Lindquist, U.S. EPA

Issues of Scale

Regional scale

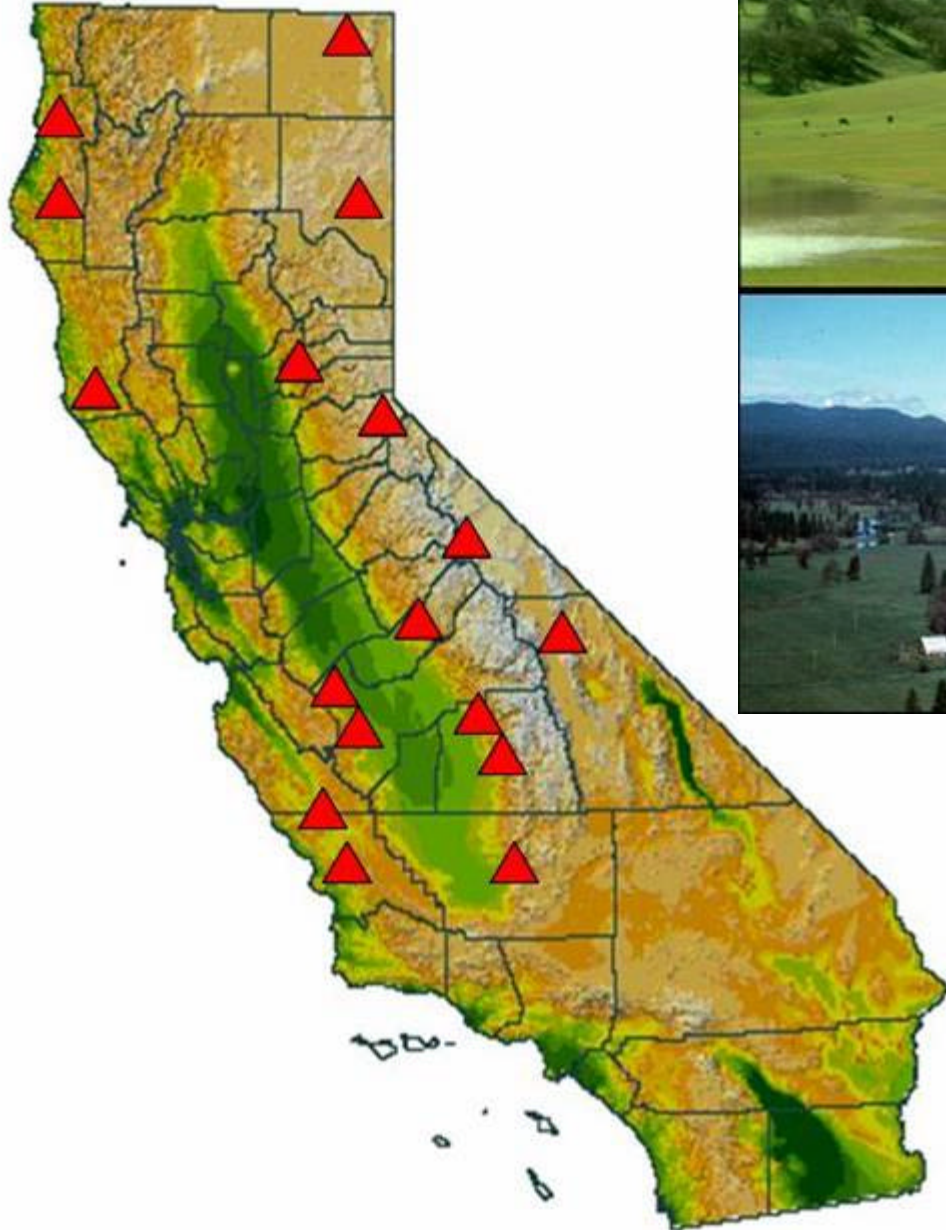
- provides context

Small watershed

- management unit

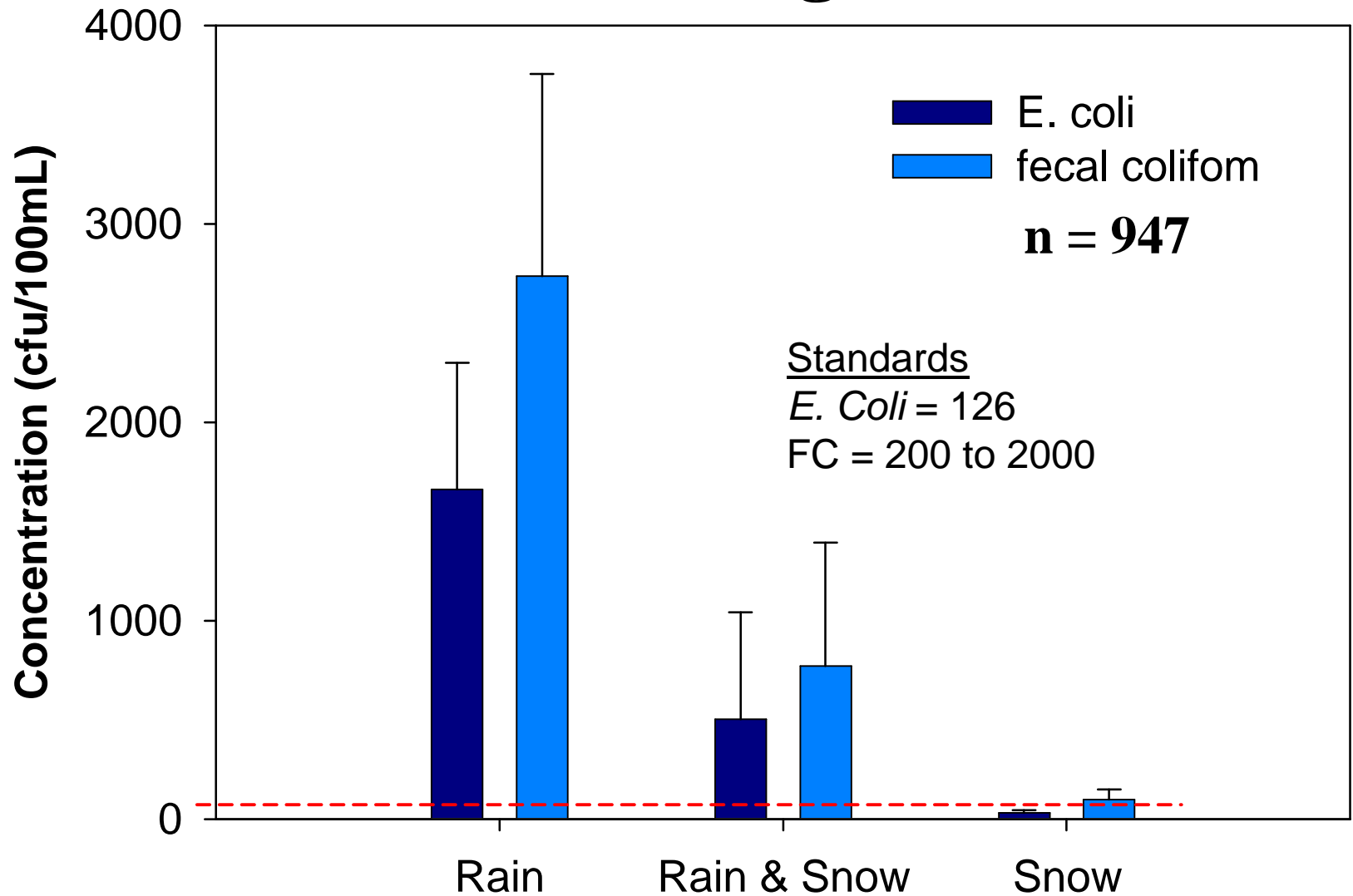
Hillslope/Plot

- processes and mechanisms



State-wide Survey
24 streams
2000 and 2001 water years

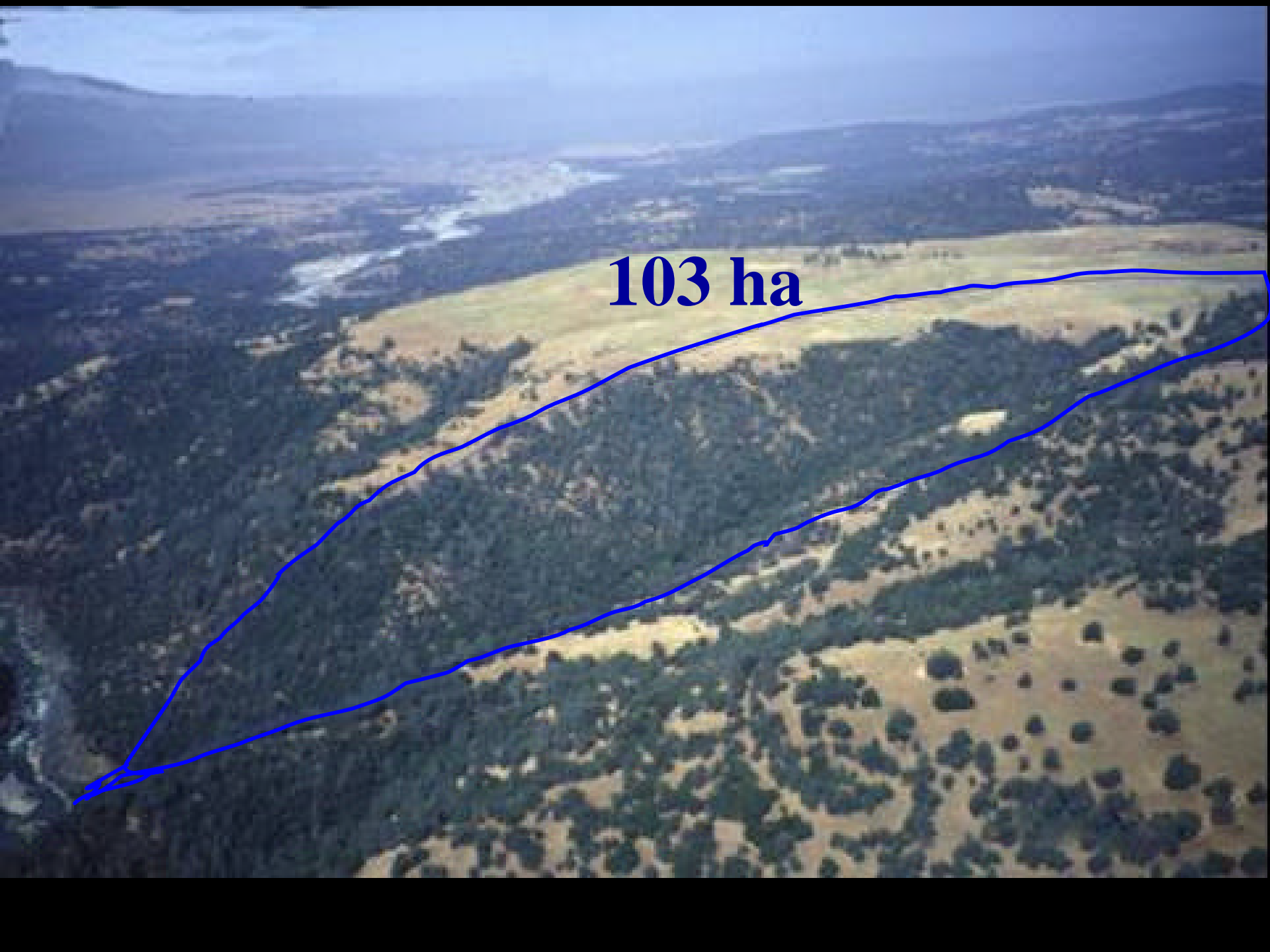
Pathogens



Experimental Annual Rangeland Watersheds

- UC annual rangeland research centers
- Experimental watersheds
 - HREC (4), SFREC (4)
 - Continuous streamflow and weather data
 - Intensive sample collection
 - Control of land use



An aerial photograph showing a landscape with a mix of green forest and brownish-yellow open areas. A blue line outlines a specific region. The text "103 ha" is overlaid in the center of the outlined area. In the background, a river flows through a valley, and distant hills are visible under a clear sky.

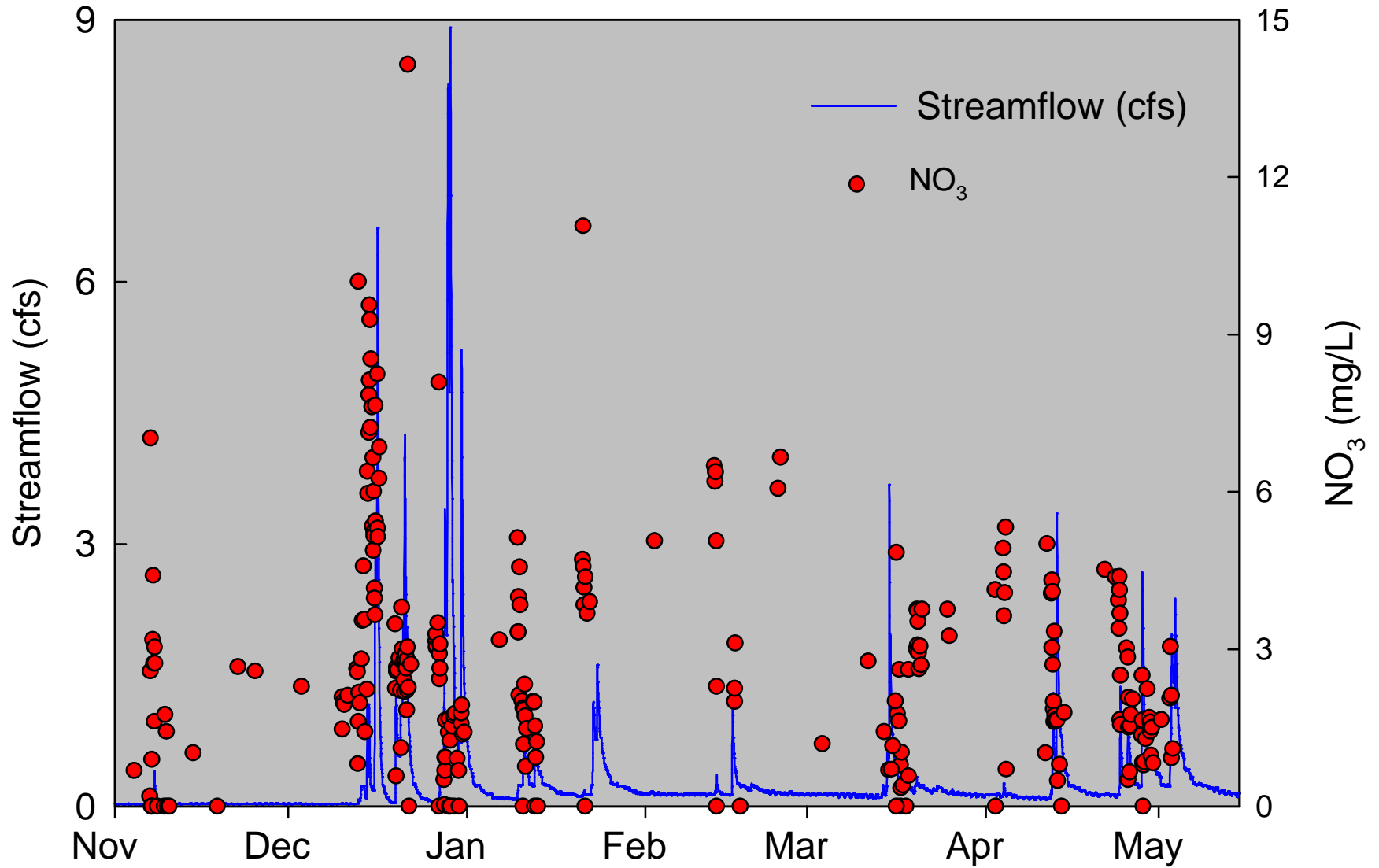
103 ha

Grazing Treatments

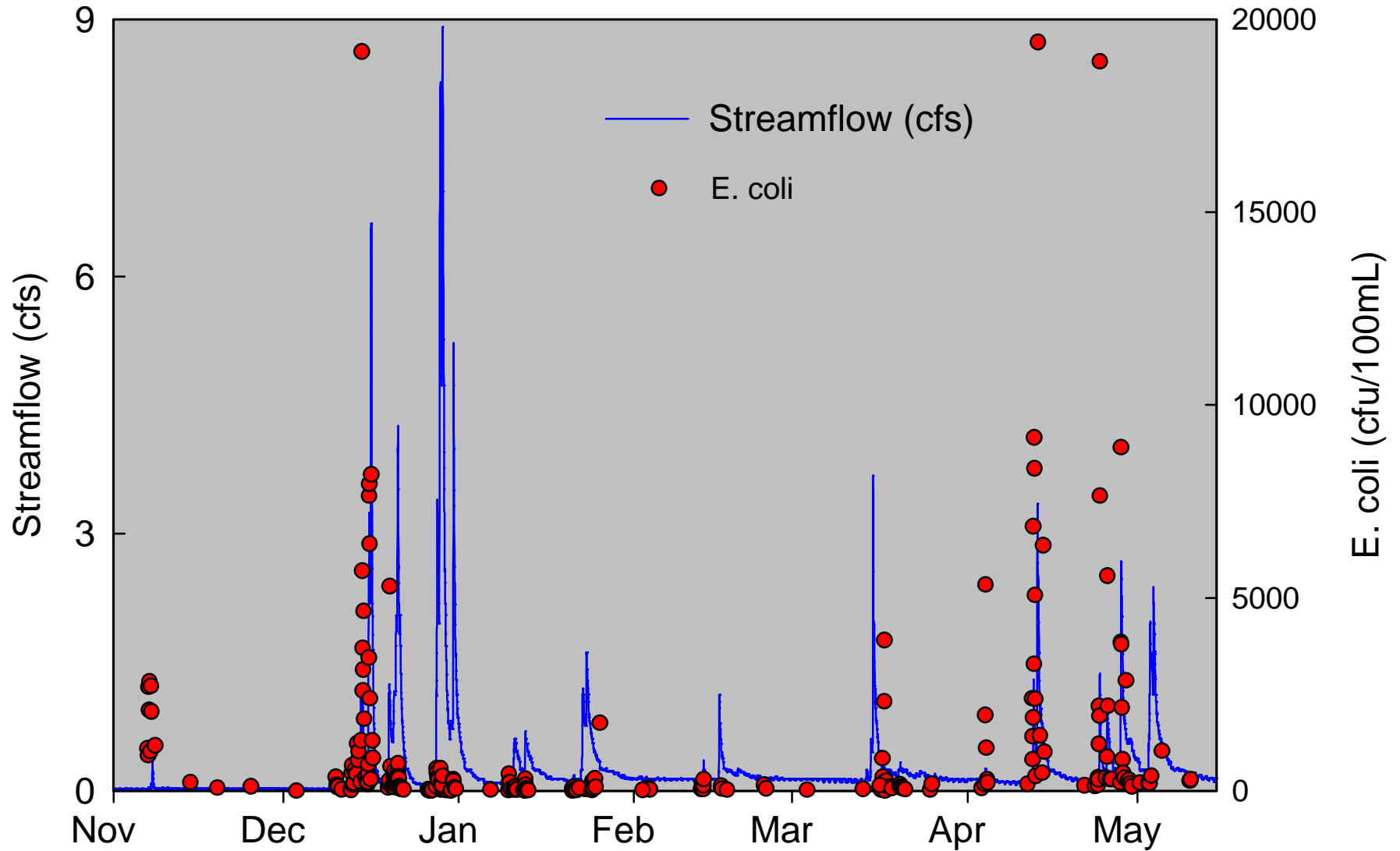
- **No grazing**
- **1500 lb/ac RDM**
- **1000 lb/ac RDM**
- **500 lb/ac RDM**



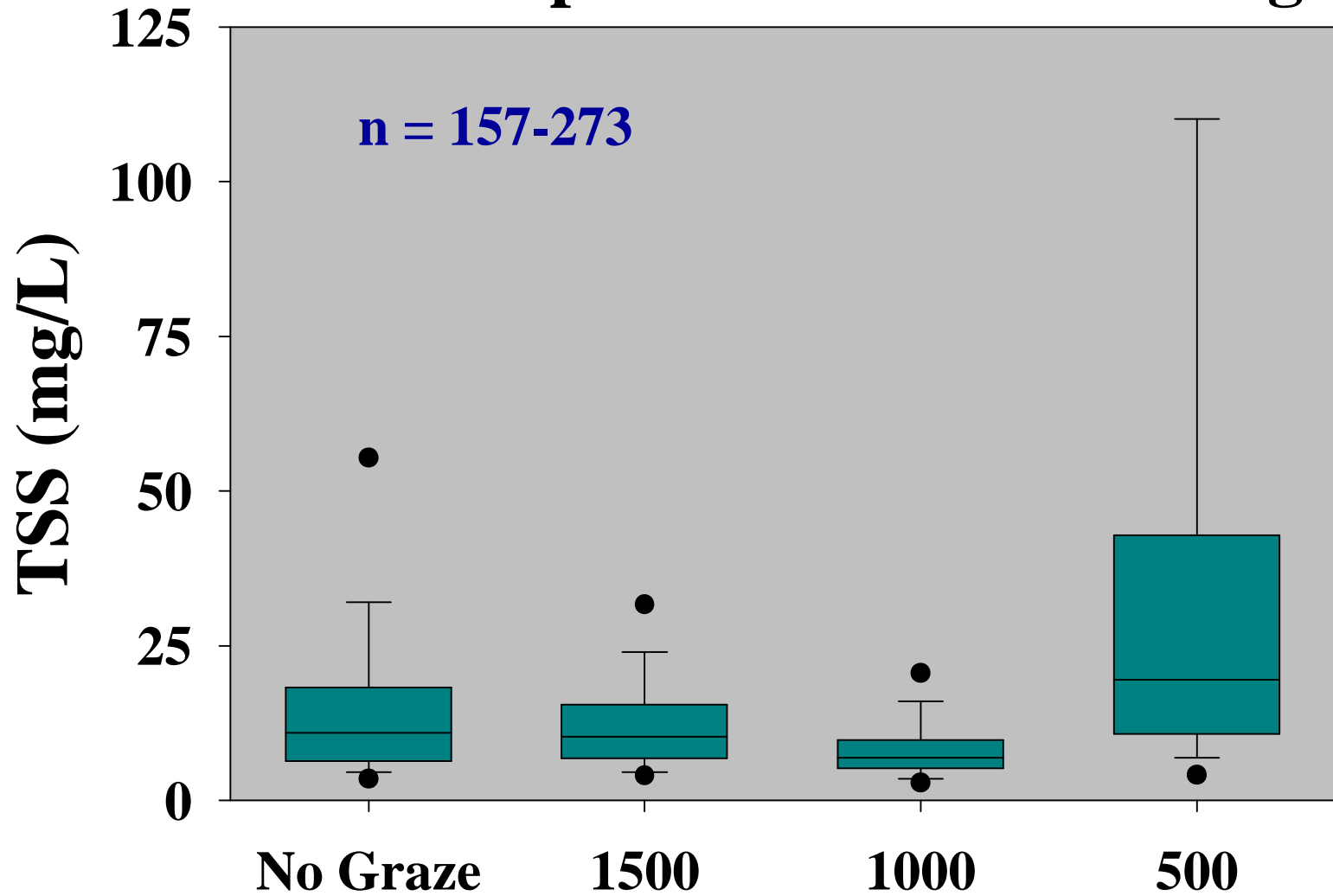
Nitrate - 500 lbs/acre RDM



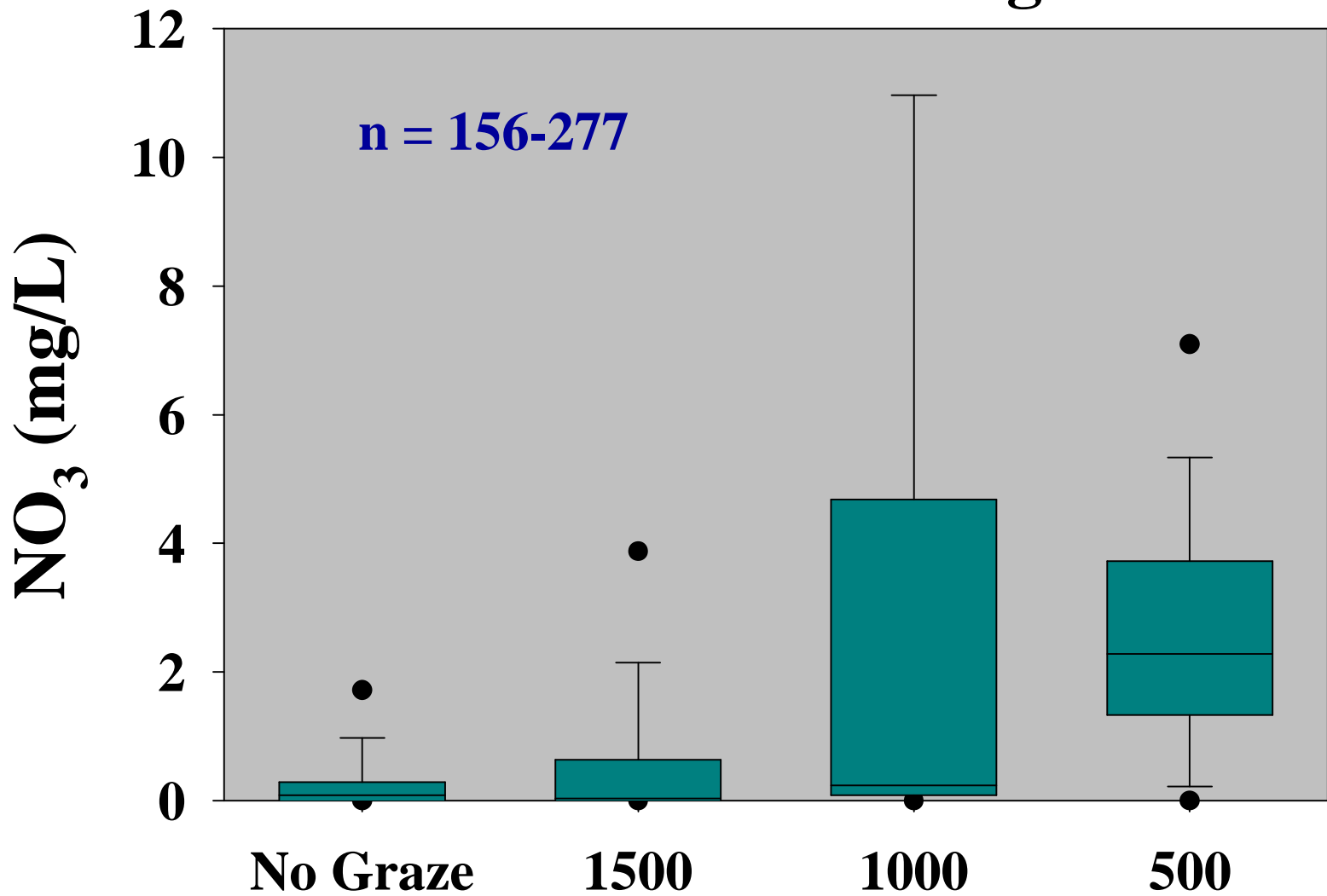
E. coli - 500 lbs/acre RDM



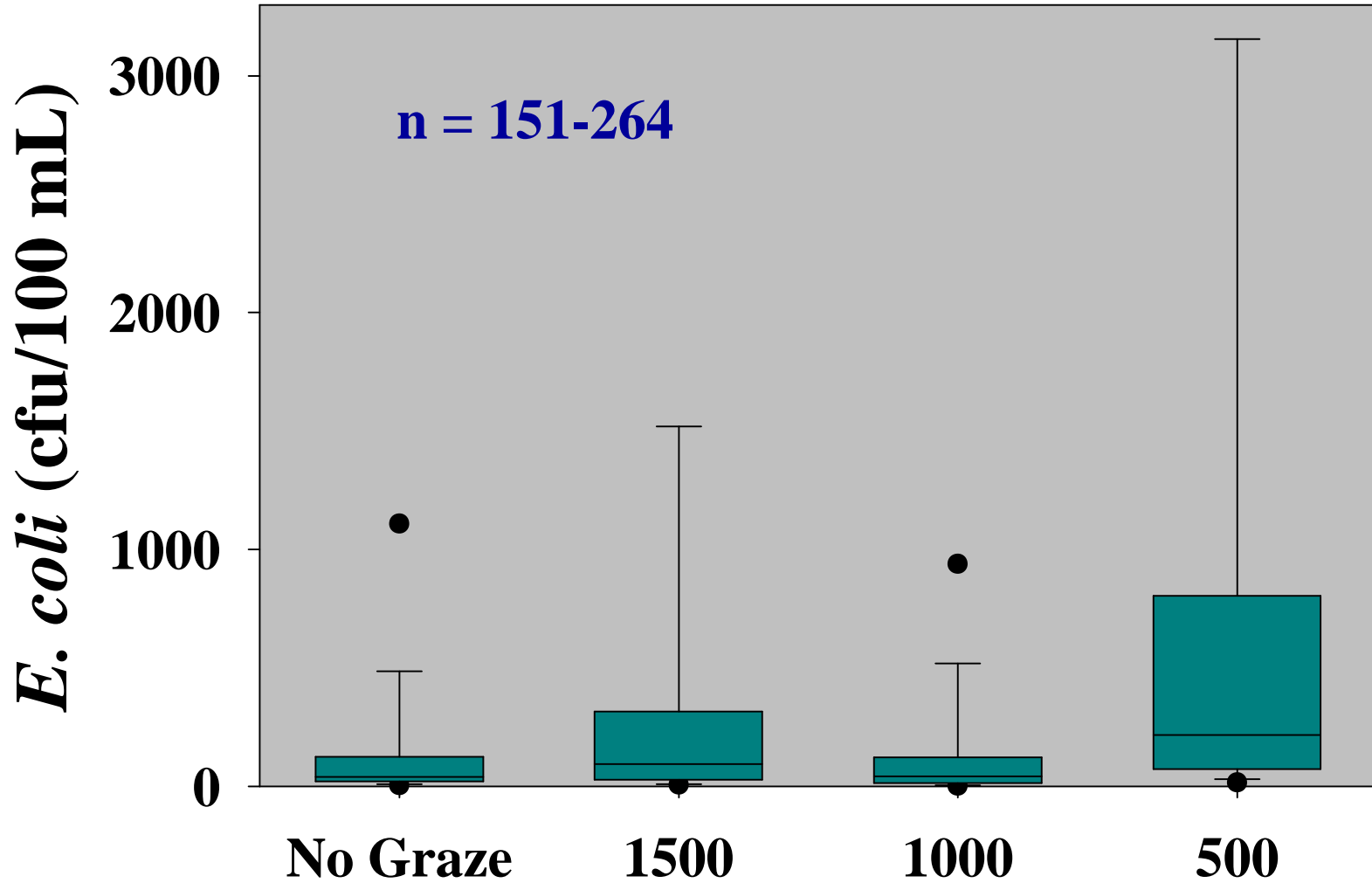
Total Suspended Solids - Grazing



Nitrate - Grazing

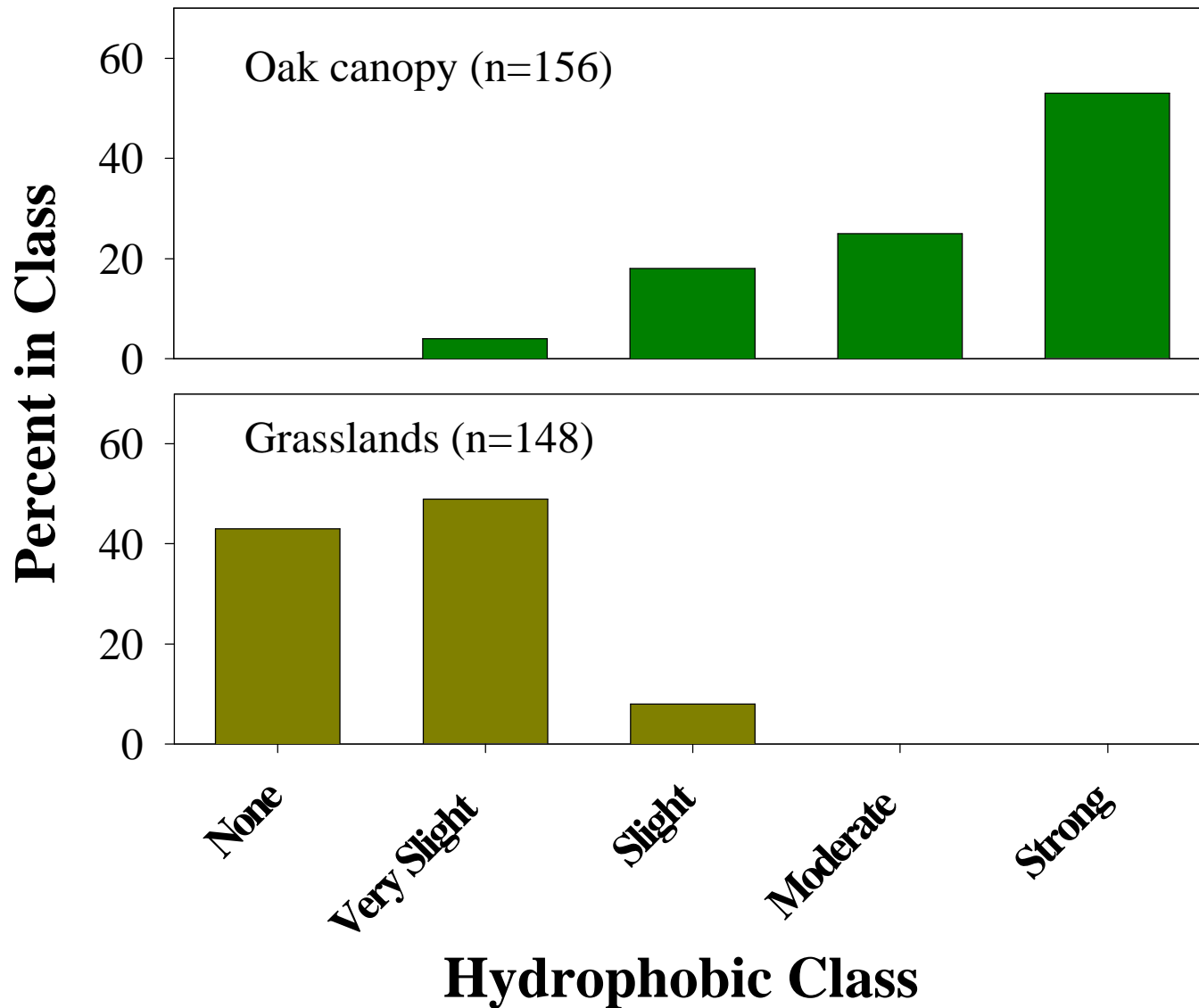


E. coli - Grazing

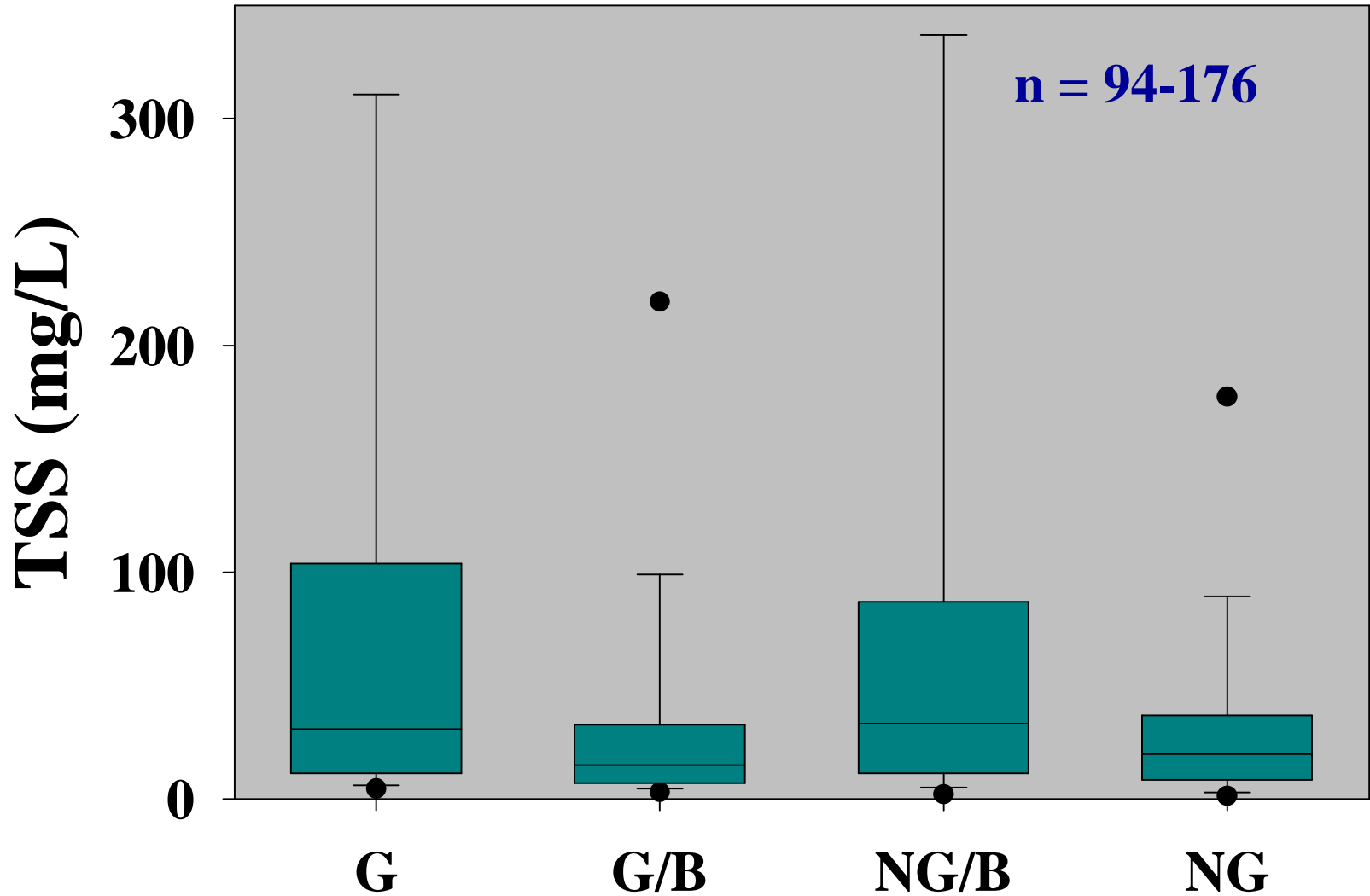




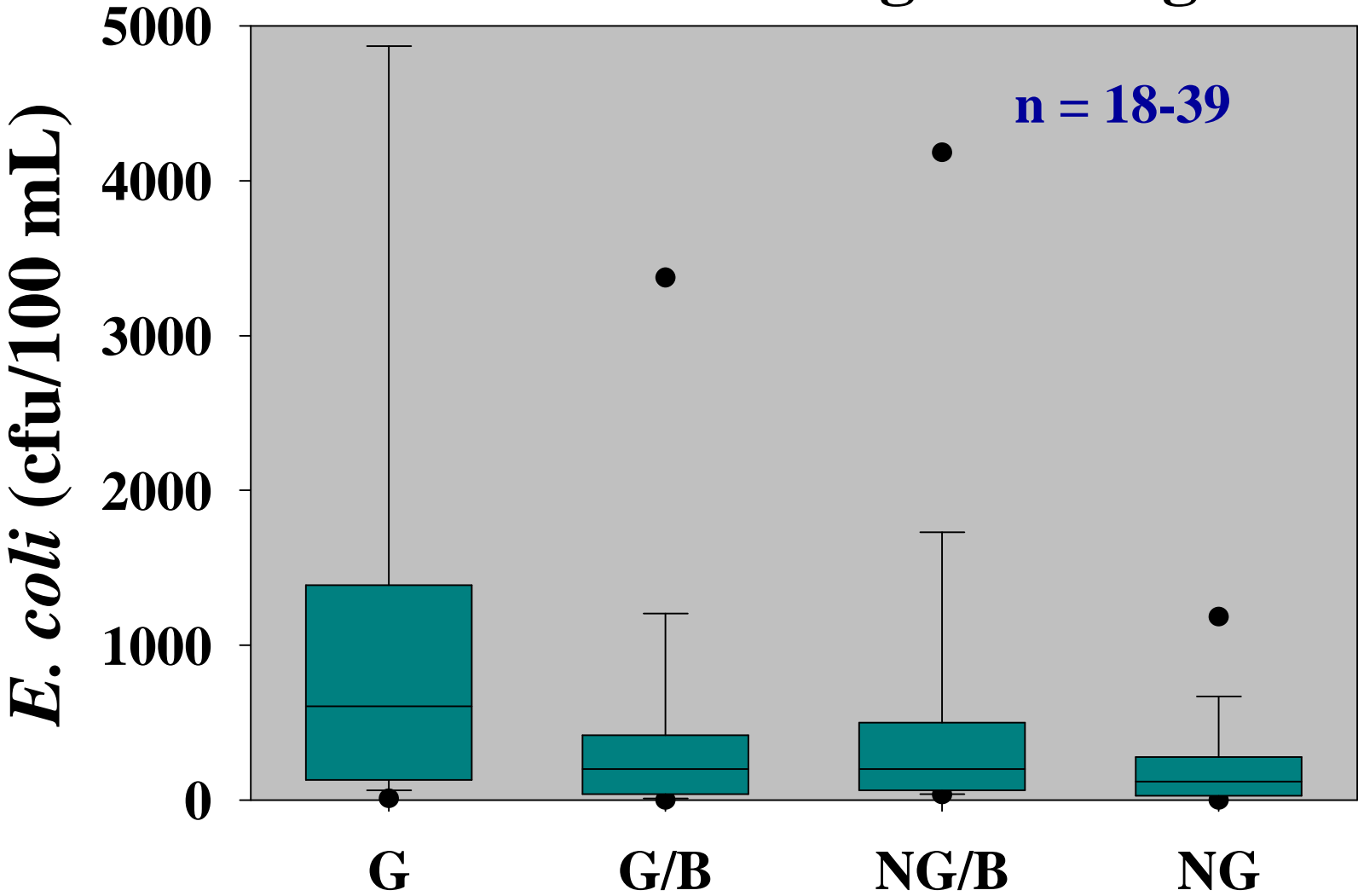
Post-Burn Soil Hydrophobicity



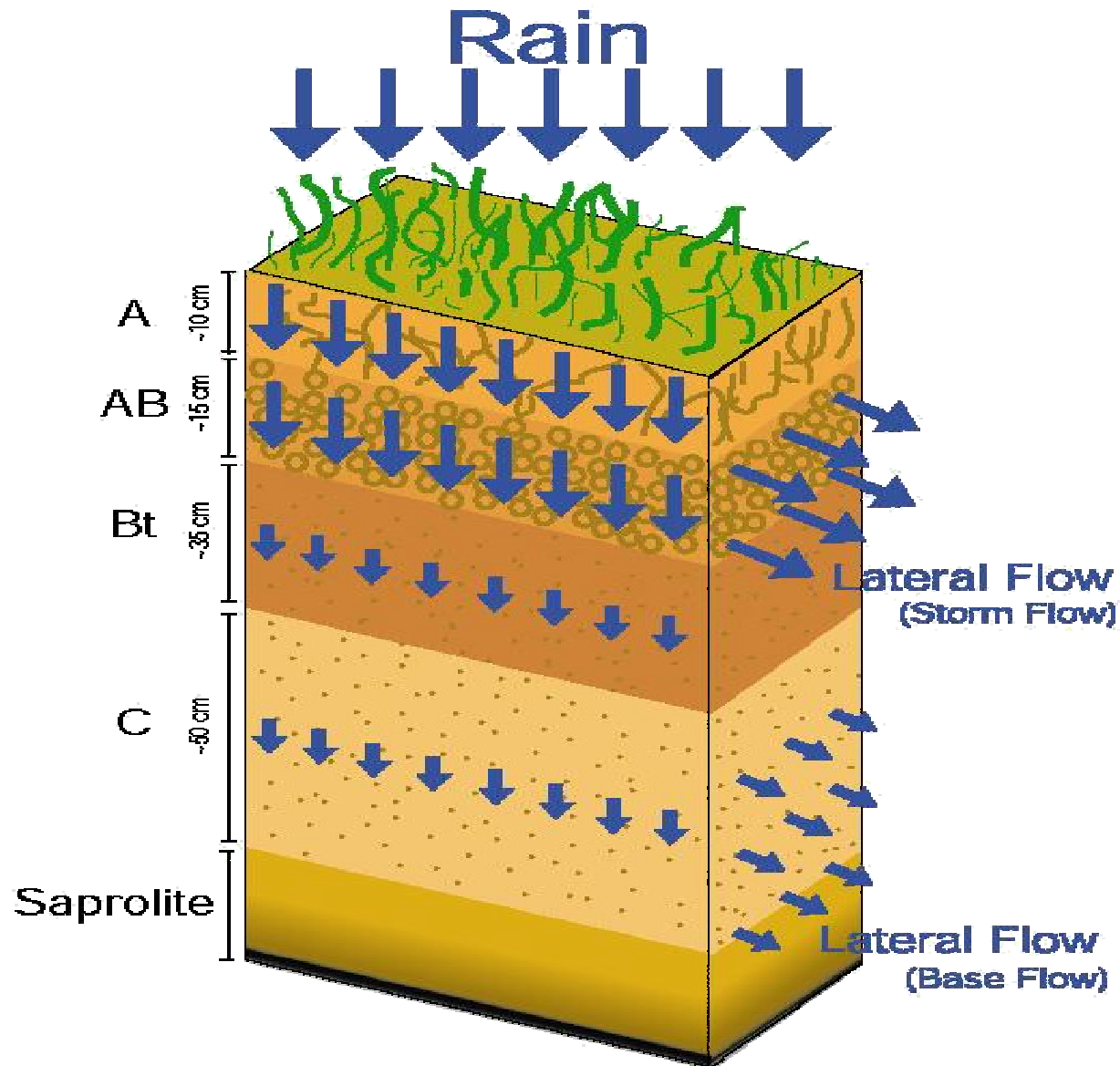
TSS - Grazing/Burning



E. coli - Grazing/Burning



Hydrologic Flowpath Affect Water Chemistry





Hillslope Trench Plot

Use of Buffer Strips in Irrigated Pastures



Wetland Treatment of Irrigated Pasture Tailwaters



2004. 10. 3 11:16

Educational and Extension Activities

2 - Faculty

3 - Cooperative Extension Specialists

2 - Farm Advisors

Staff of Research & Extension Centers

Education & Extension



Graduate & Undergraduate Education



Continuing Education, Professional Development



Ranch WQ Planning Short Courses



University Courses

- **Ecology**
- **Hydrology**
- **Soil Science**
- **Range Management**

USDA funding (3 yrs)

- **1 M.S. thesis**
- **17 internships**



Continuing Education



- Annual field day activities at SFREC and HREC
- USDA-NRCS Range Continuing Education Conference
- CA Department of Forestry and Fire Protection
- DANR - Rangeland Watershed Workgroup

Continuing Education



- **California Society for Range Management**
- **Research Center Administrators Society**
- **Instituto Nacional de Agricultura, Chile**

UCCE-NRCS Ranch WQ Courses

- **Targets ranch managers**
- **750+ ranches attended course across CA**
- **1,500,000 acres represented**
- **70% participants developed ranch water quality plans.**
- **90% implemented BMPs following course.**



Interactions with Federal, State and Local Agencies

- **Federal science advisor (Jack Marburger)**
- **State legislature briefing (TMDLs)**
- **CALFED Drinking Water Protection Program**
- **CA Regional Water Quality Control Boards**
- **CA Farm Bureau Federation**
- **CA Cattlemen's Association**
- **California Water Institute**
- **Citizens monitoring groups**

