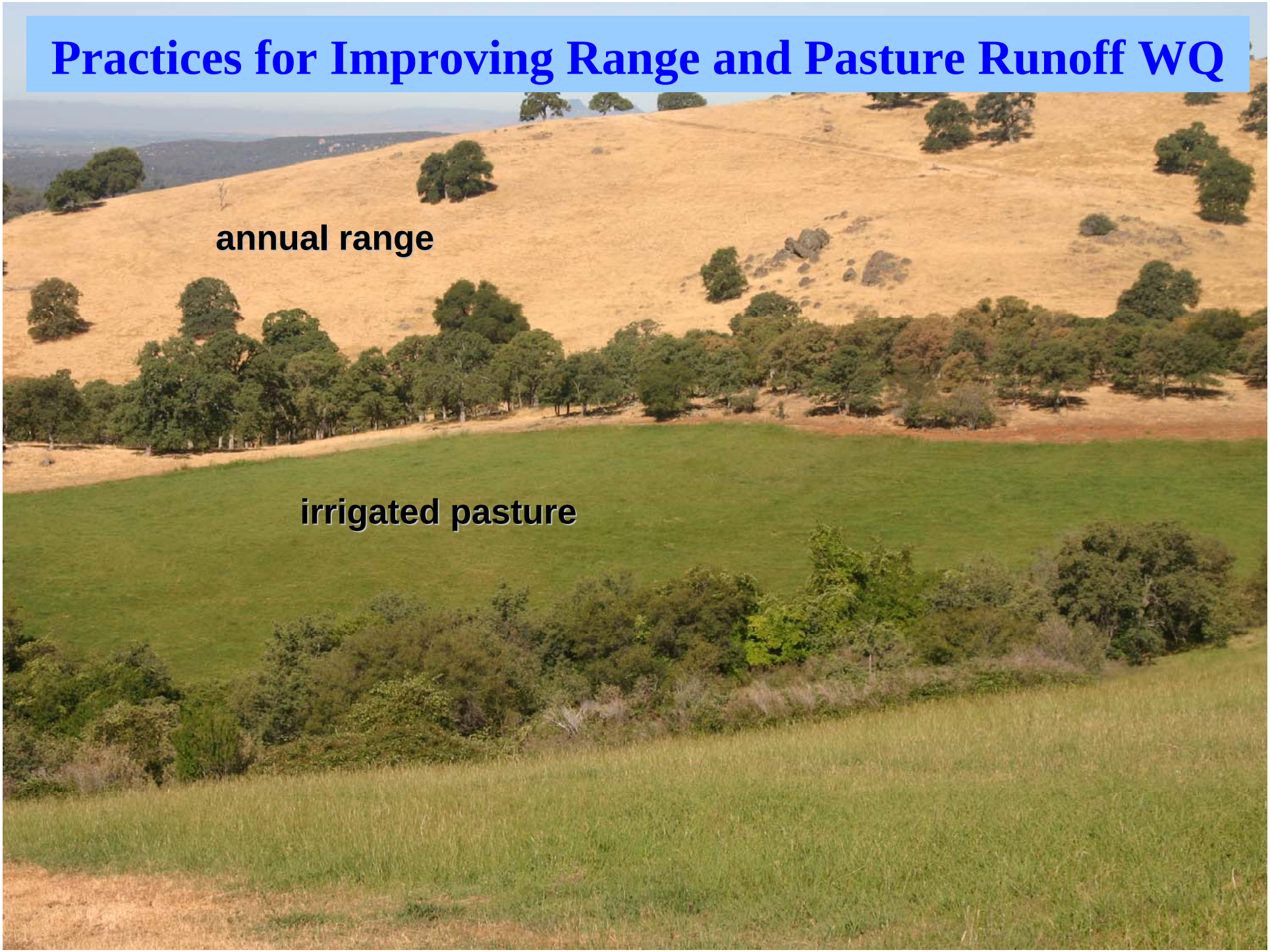
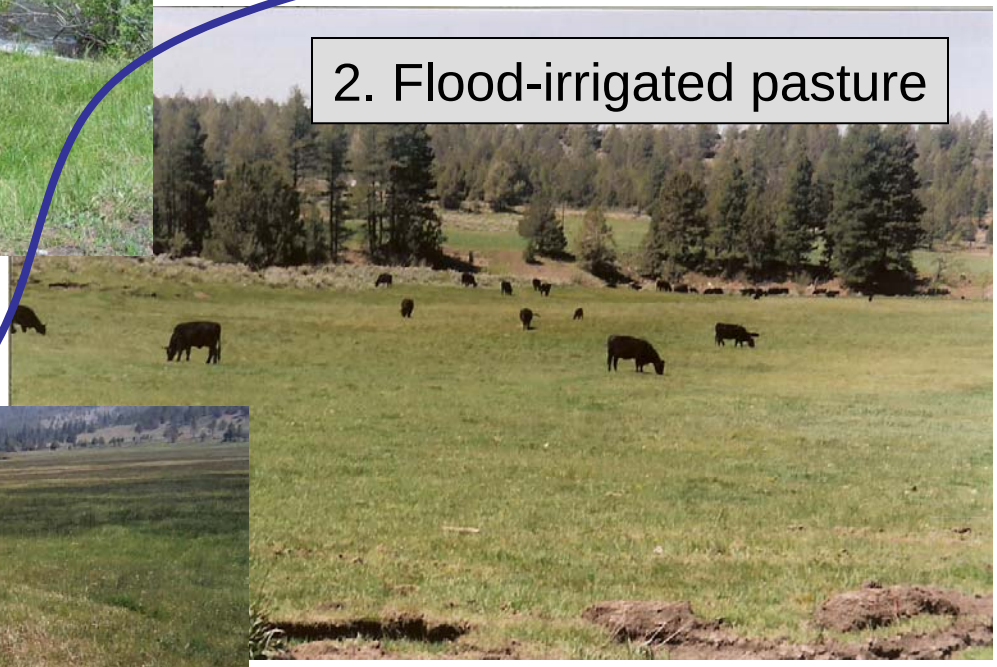
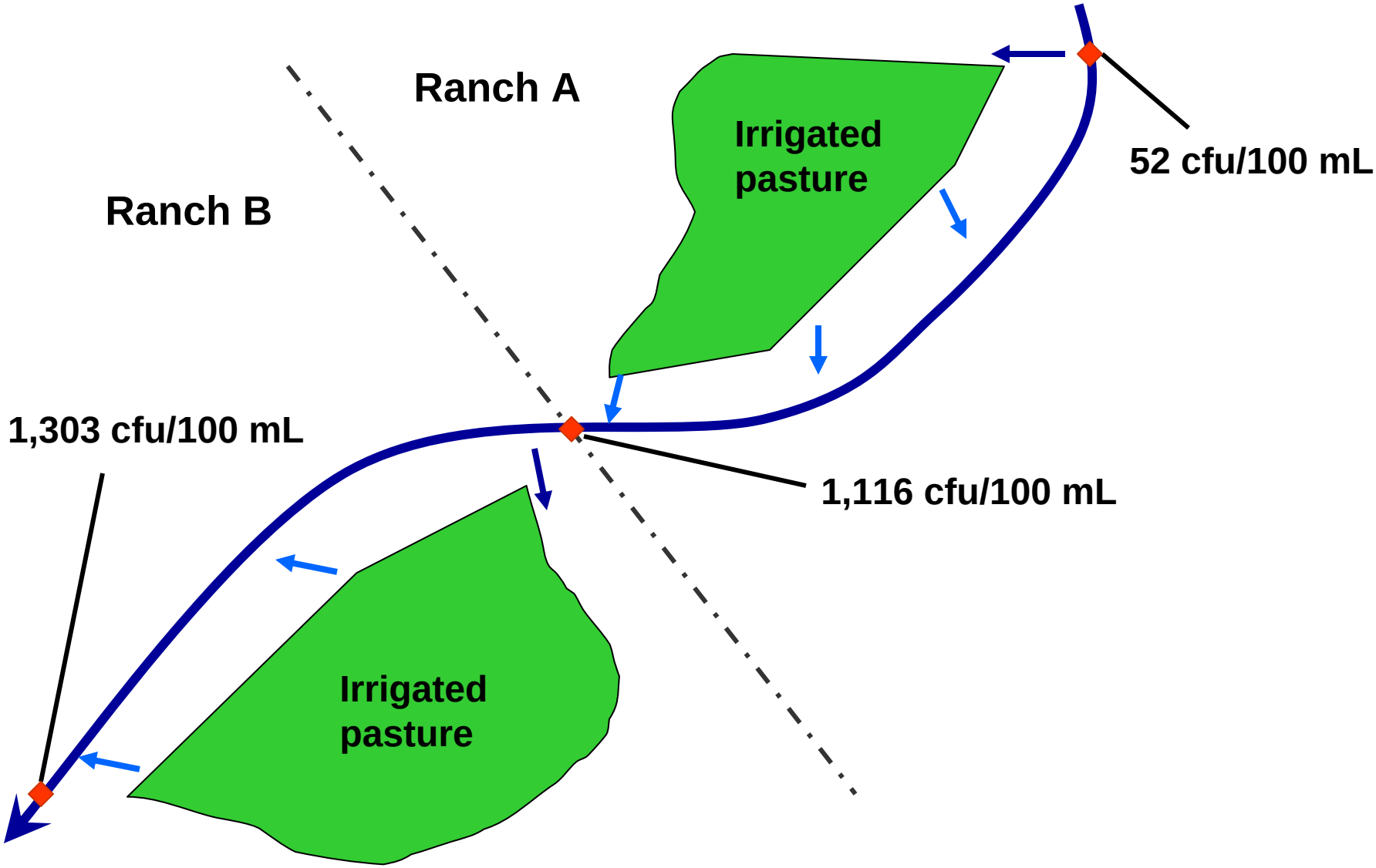
Practices for Improving Range and Pasture Runoff WQ



Survey of 10 stream diversion based irrigated meadows



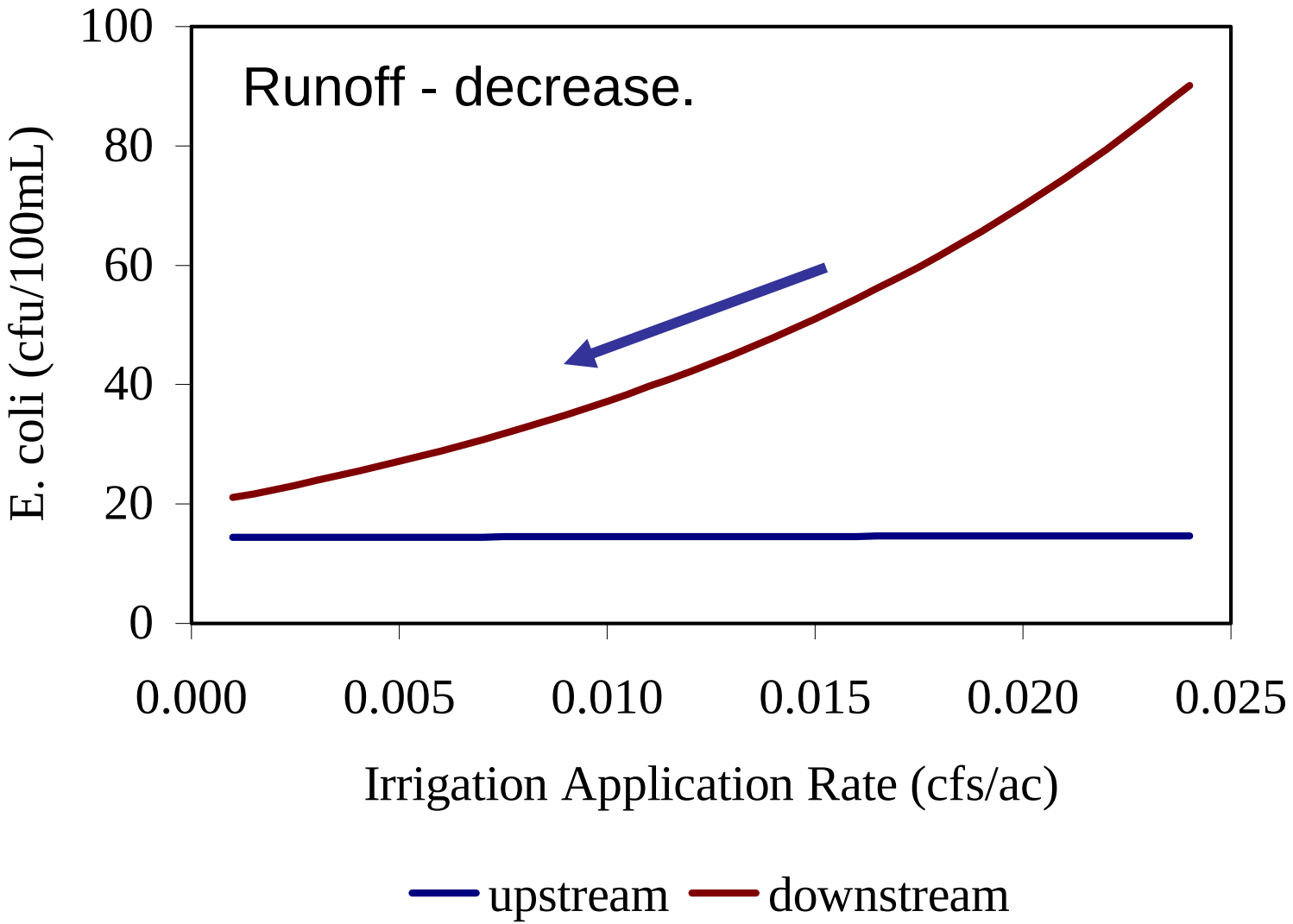
Sample above and below, record management



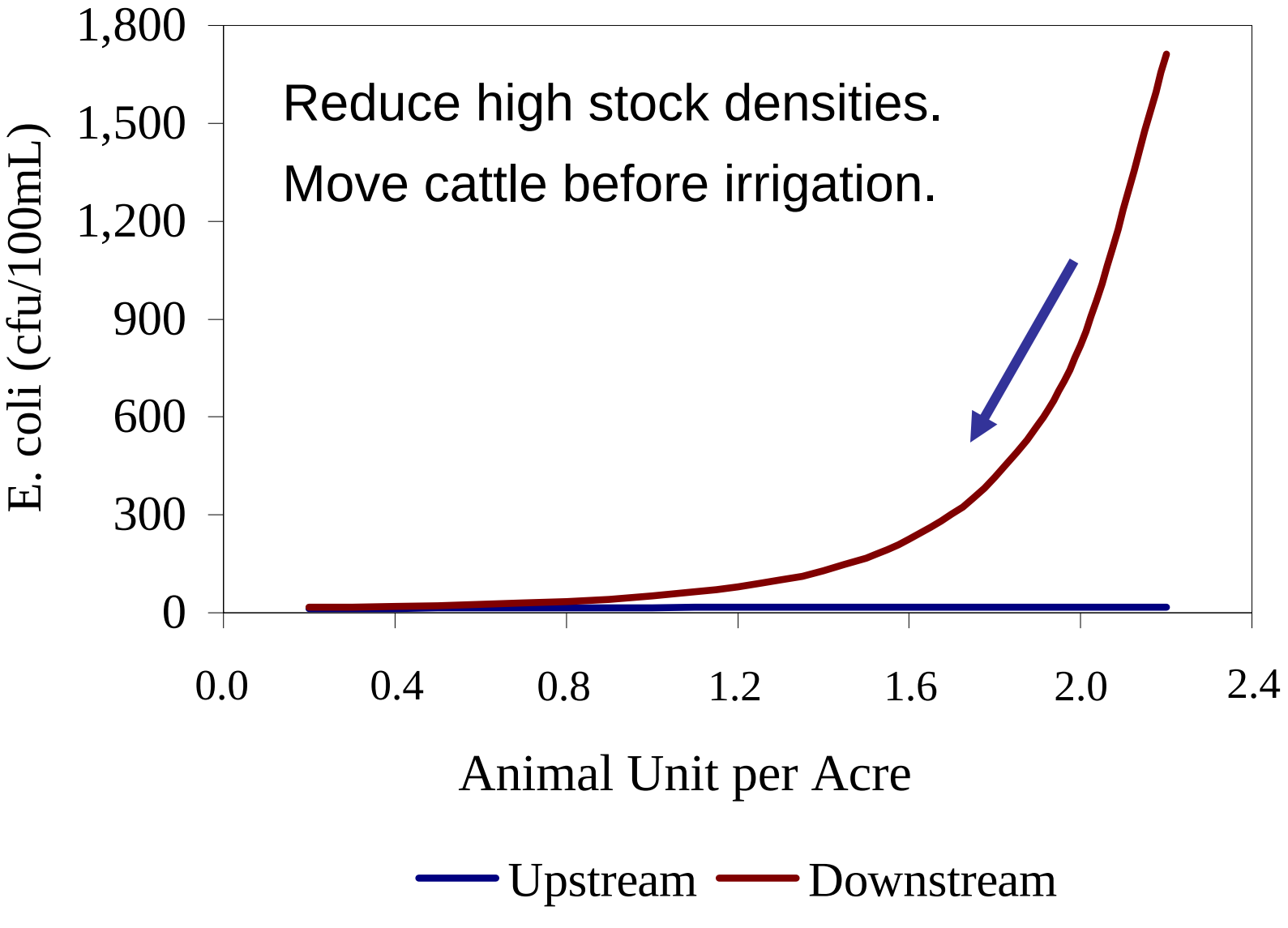
Change in Concentration (Below – Above)

Stream	*E. coli*	TSS	E.C.
1	-1036	-2.3	22.0
2	-233	-2.0	-0.1
3	-182	2.2	24.6
4	10	-5.5	2.7
5	11	4.5	54.0
6	12	-1.9	0.2
7	21	0.0	0.1
8	88	1.0	8.2
9	230	1.4	8.4
10	1064	2.8	2.3

Irrigation Application Rate & Runoff Rate

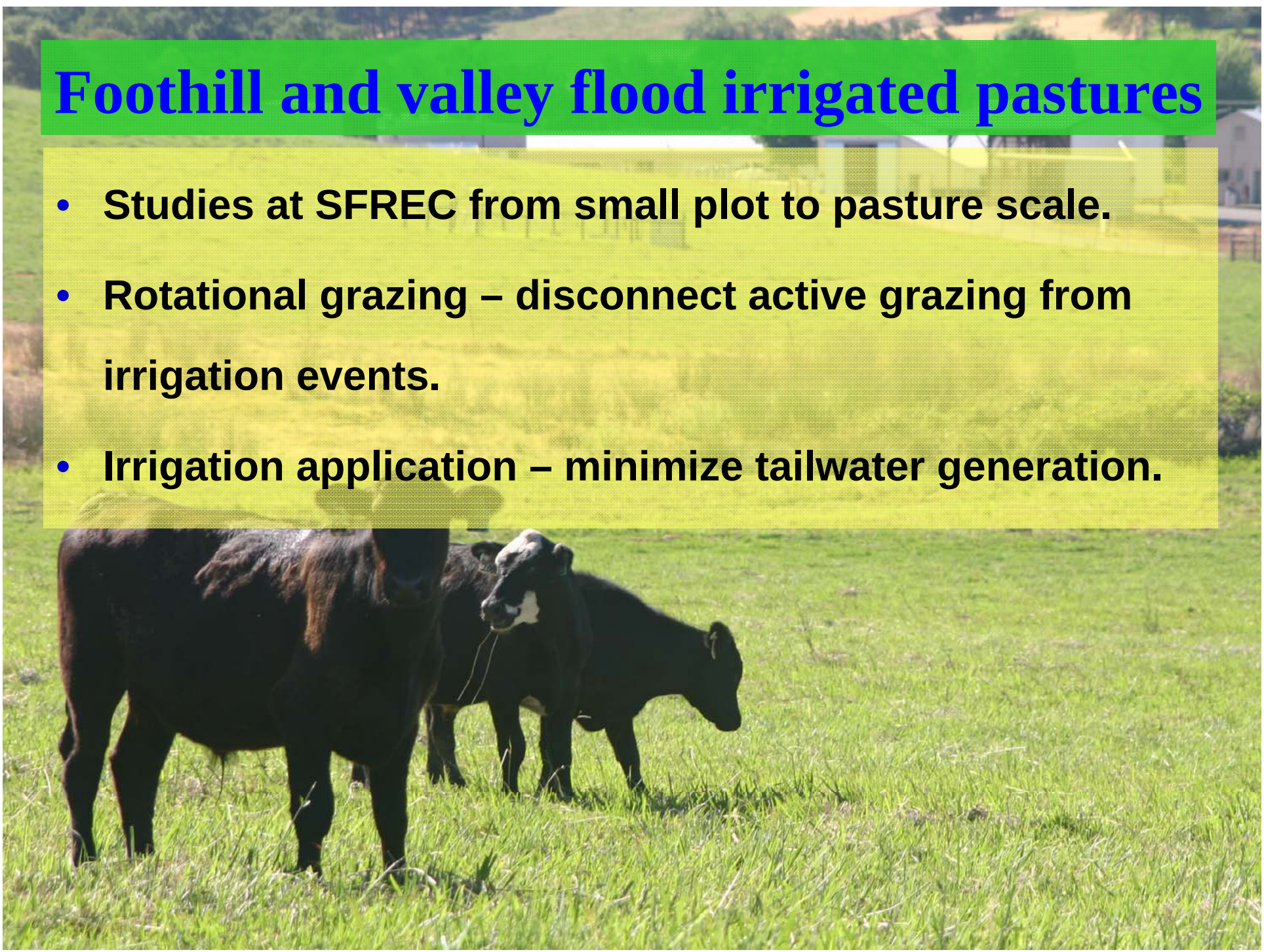


Cattle Stocking Density (AU = 1 cow)

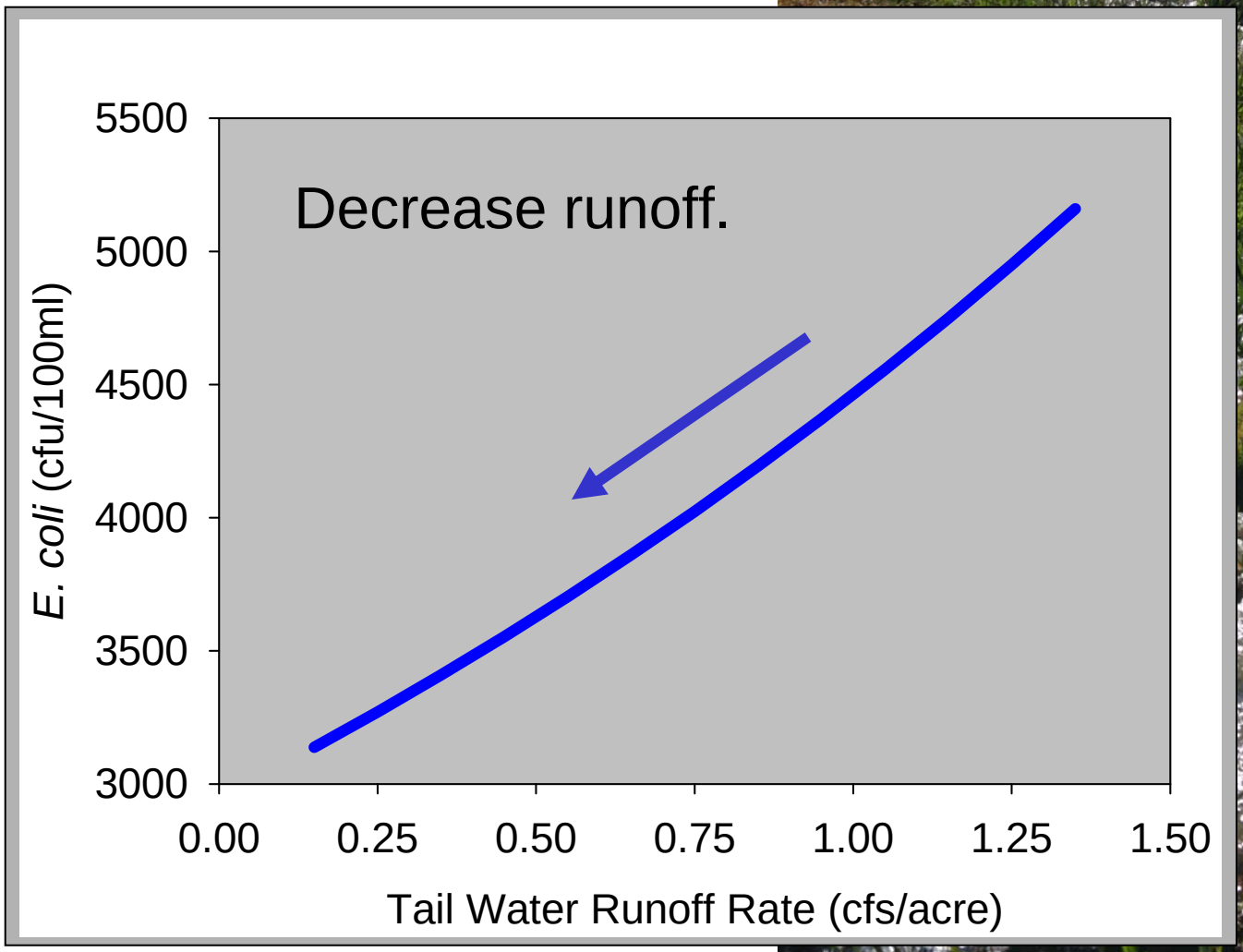


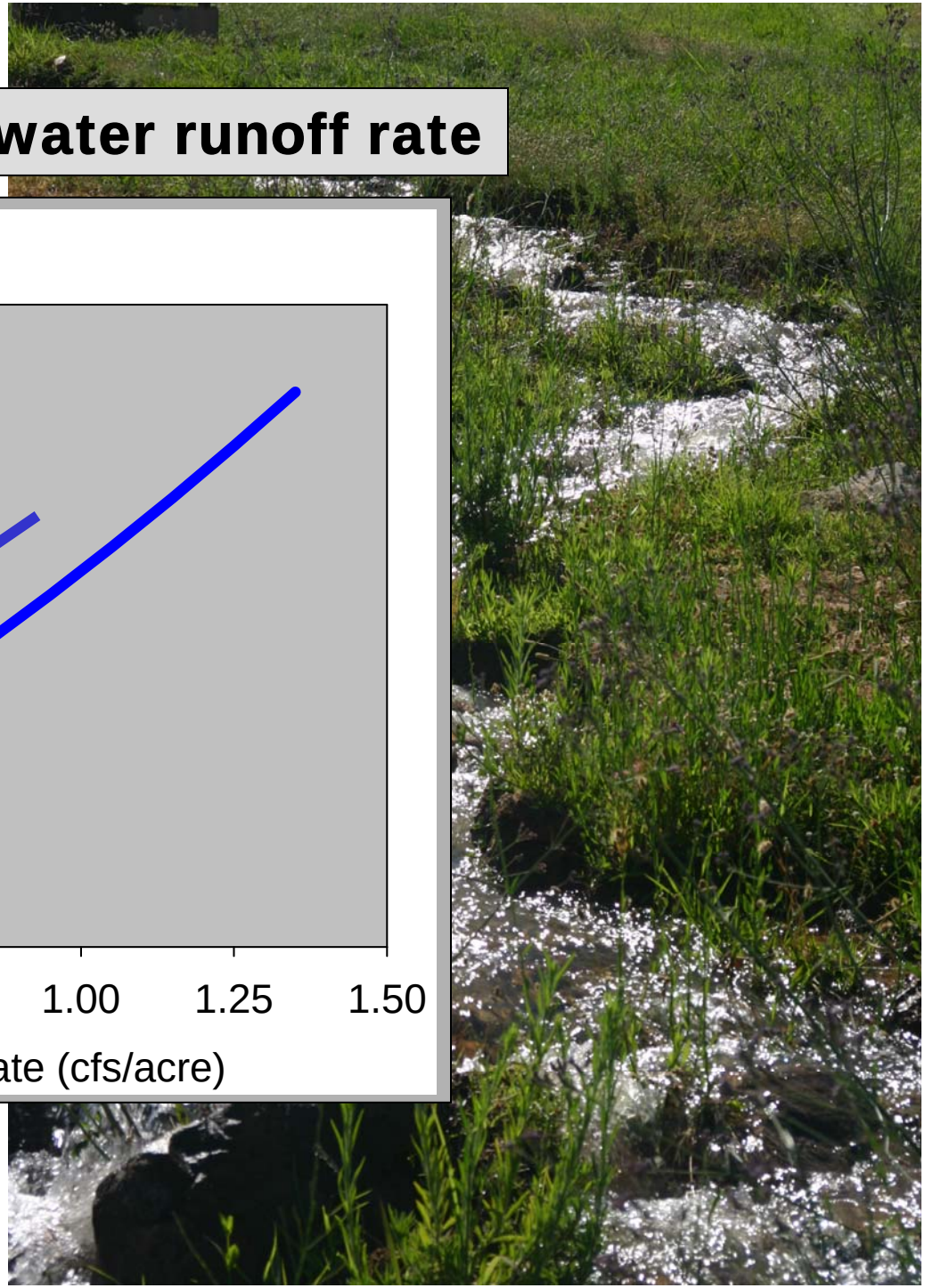
Foothill and valley flood irrigated pastures

- Studies at SFREC from small plot to pasture scale.
- Rotational grazing – disconnect active grazing from irrigation events.
- Irrigation application – minimize tailwater generation.

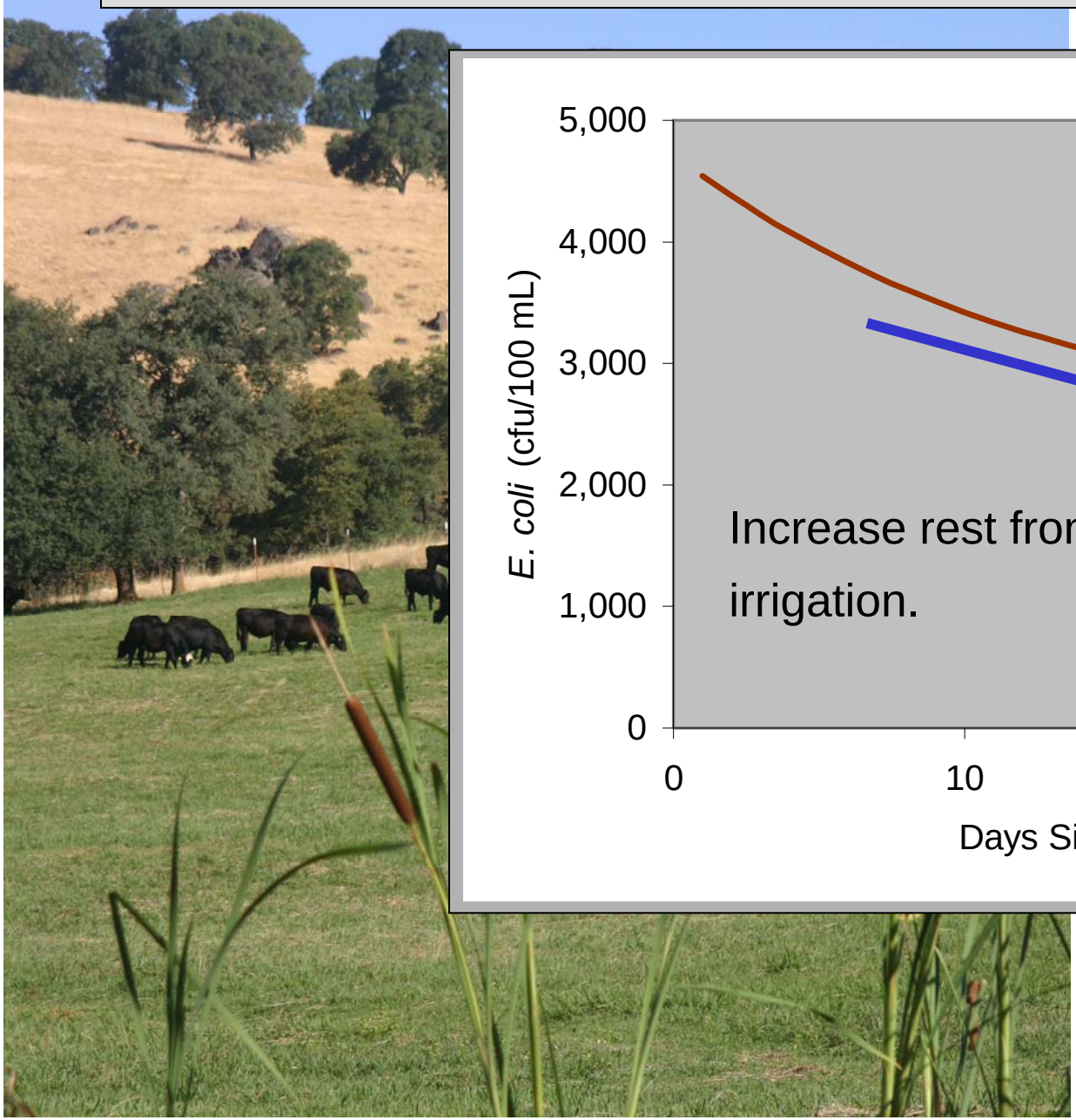


E. coli increases with tailwater runoff rate

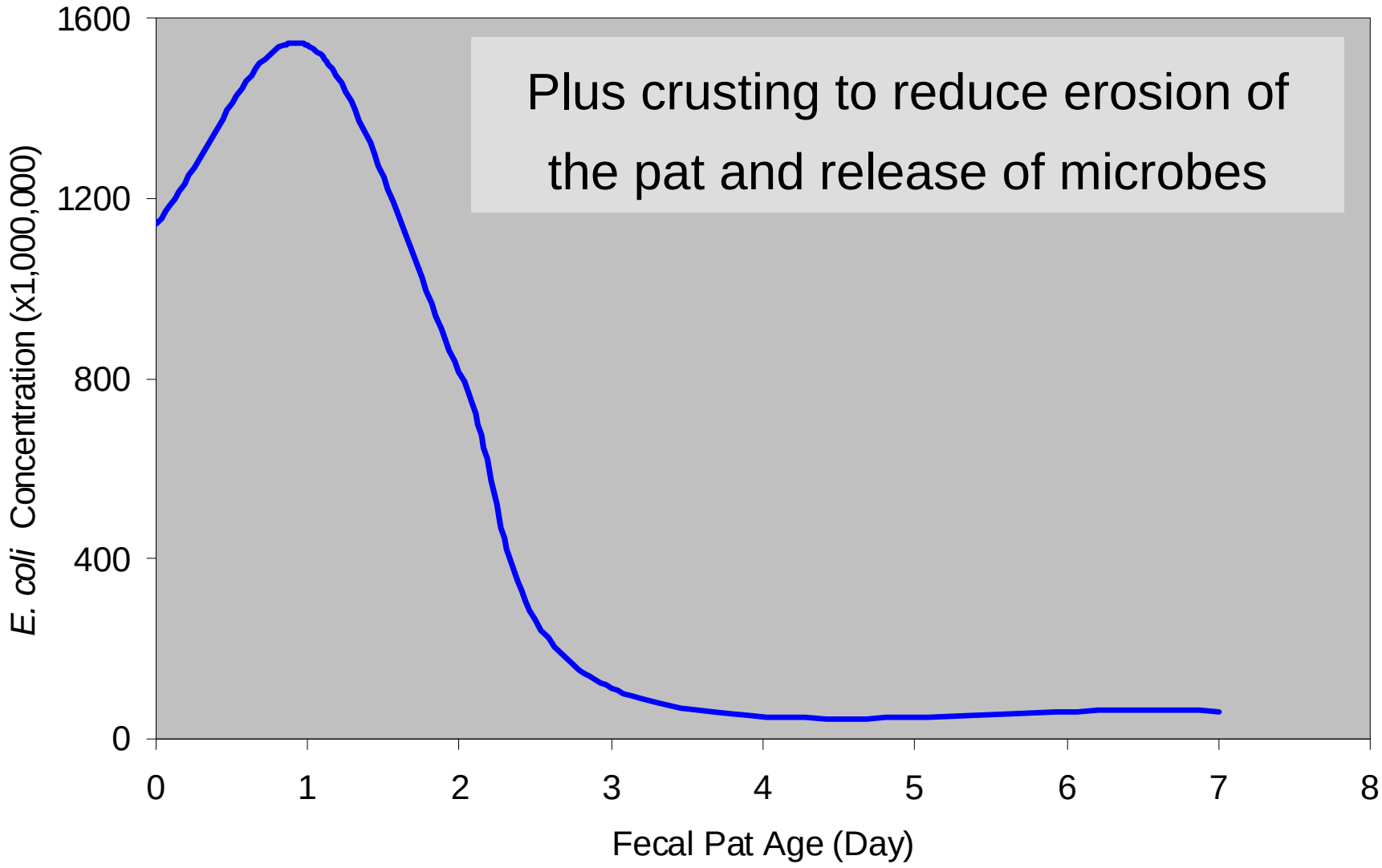




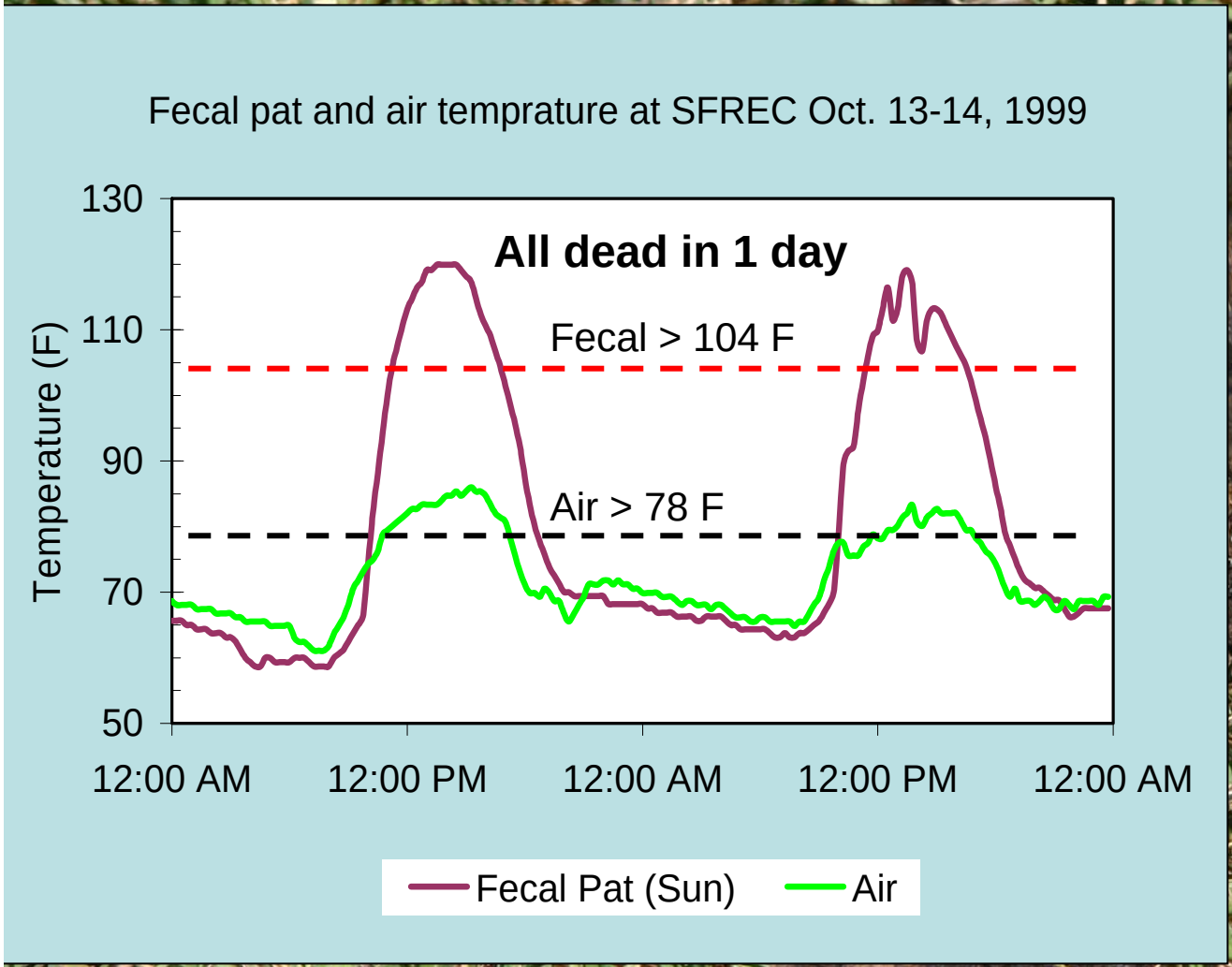
E. coli reduced by rest from grazing before irrigation



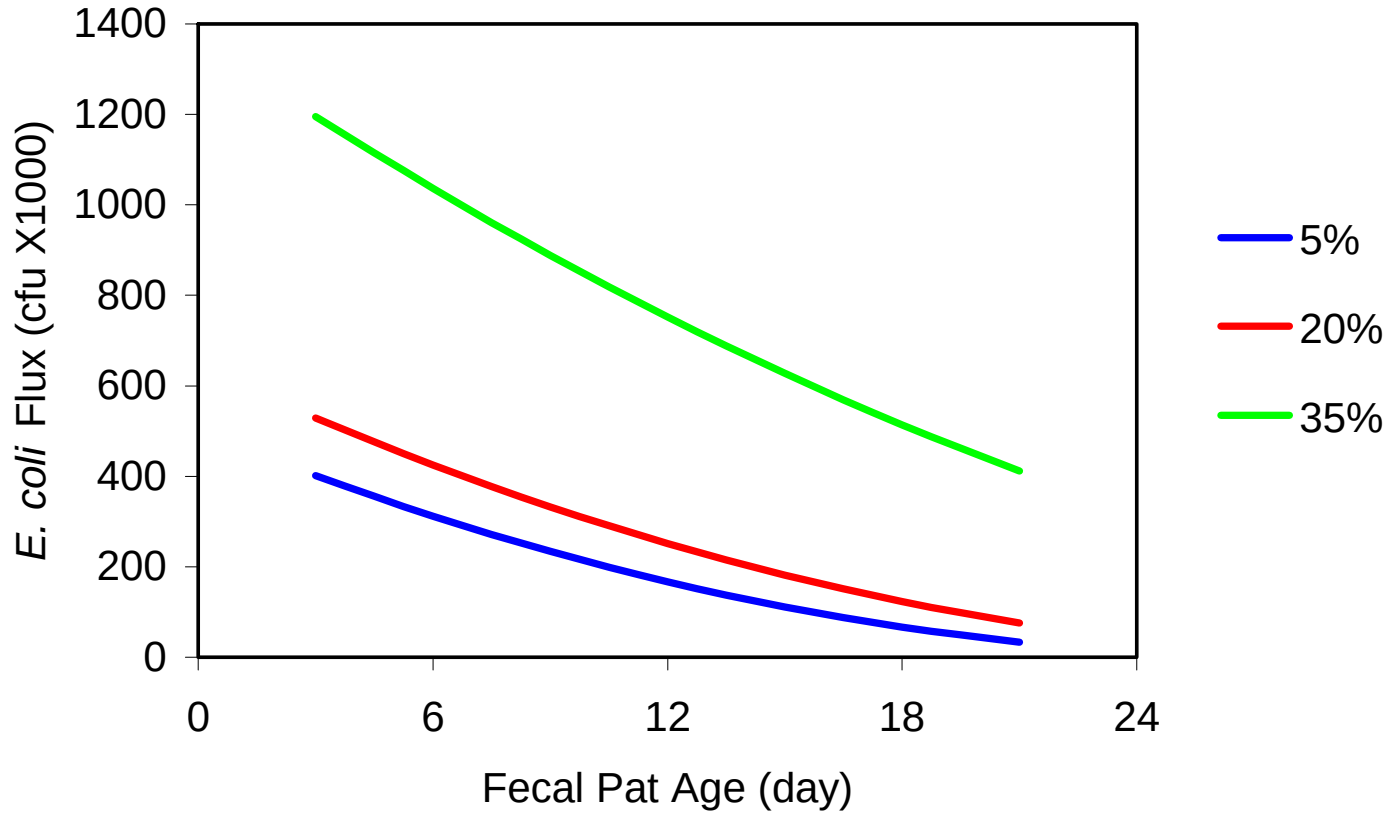
E. coli decay in fecal pat at SFREC Aug 2008



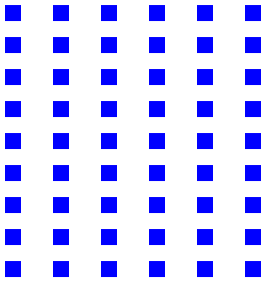
Significant thermal inactivation of *C. parvum* during spring, summer, fall.

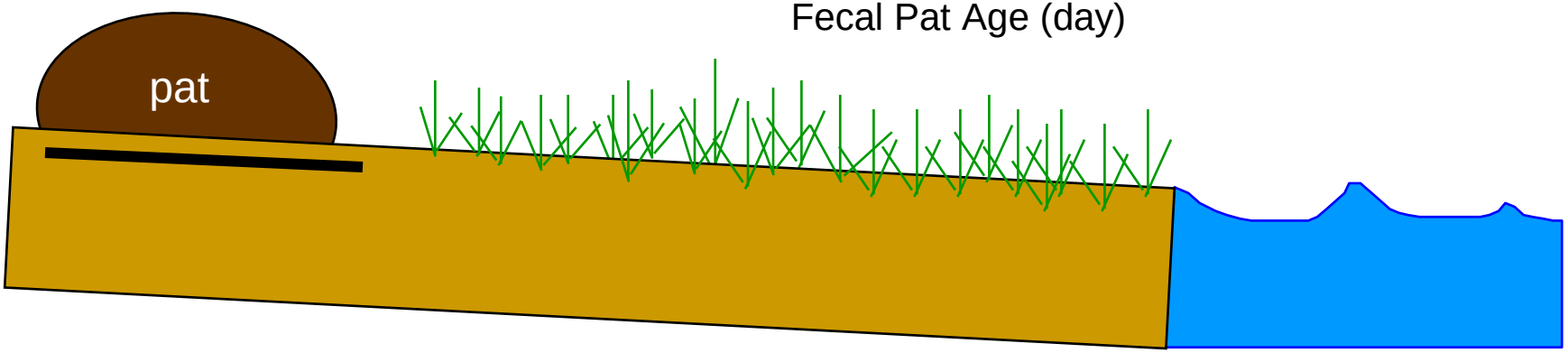


Annual Range - Winter



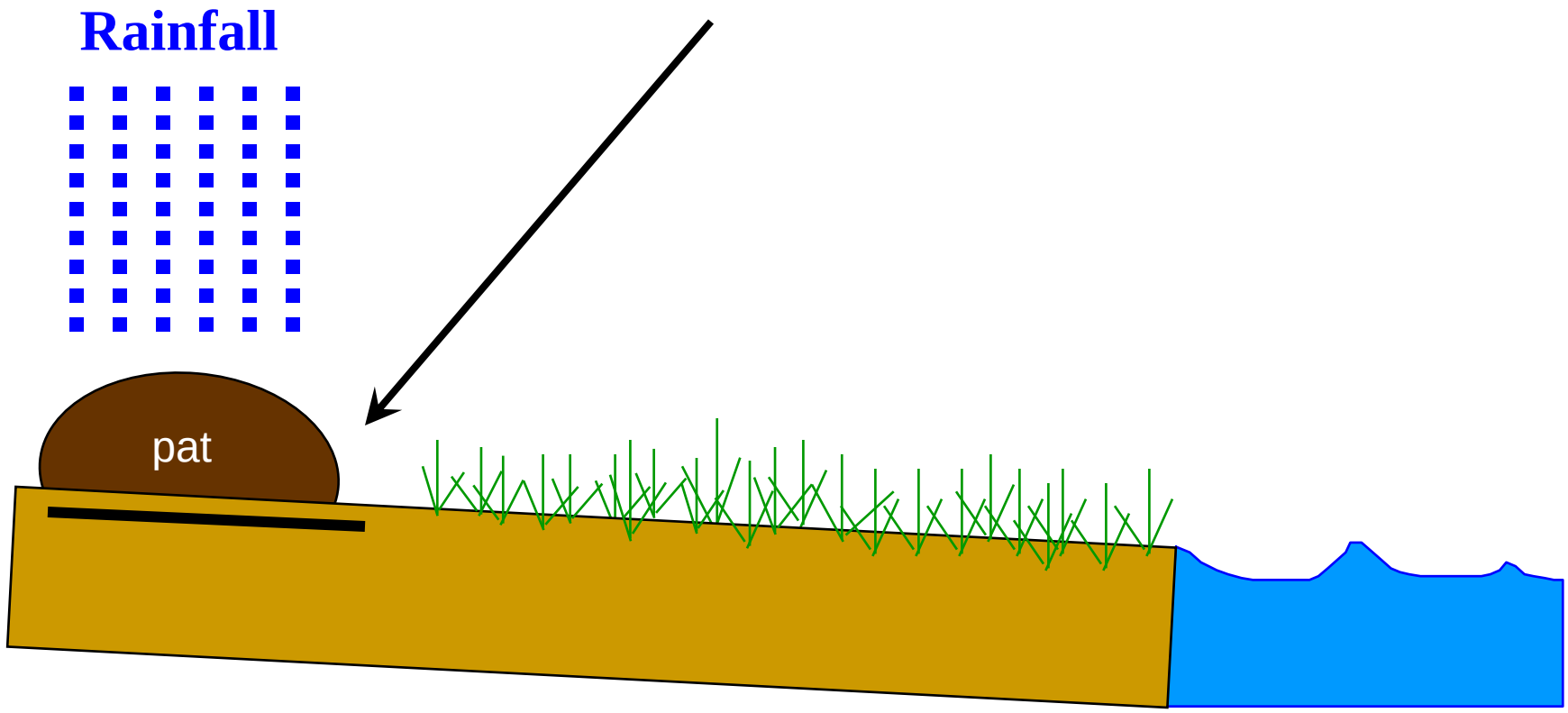
Rainfall





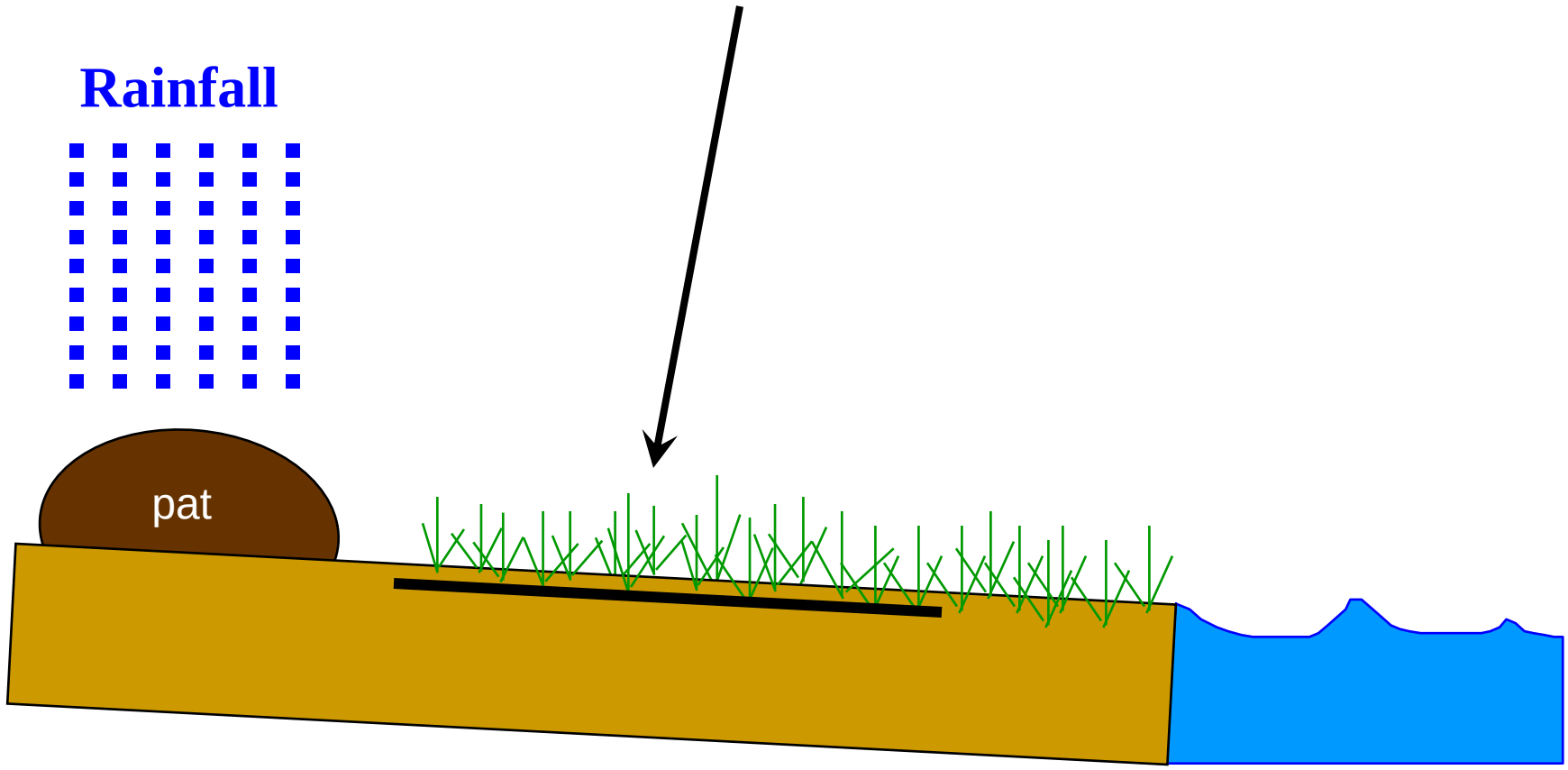
Location, location, location

>90% of *E. coli*, *C. parvum, Giardia, Salmonella* load retained in the fecal pat or trapped within 1 ft

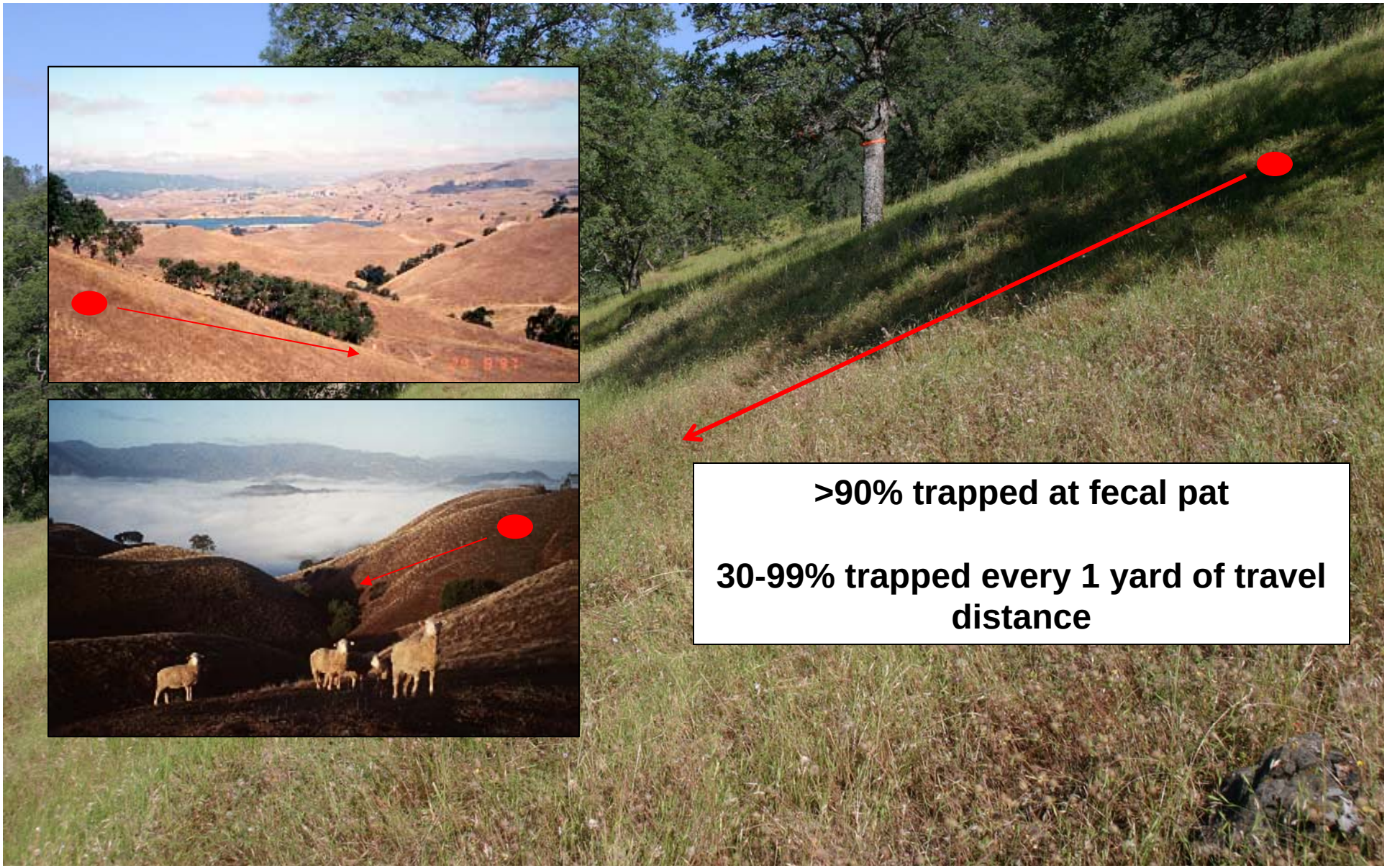


Location, location, location

An additional 30% to 99.9% trapped within 1 yard of pat



Distribute cow pats away from streams and the whole range is a buffer

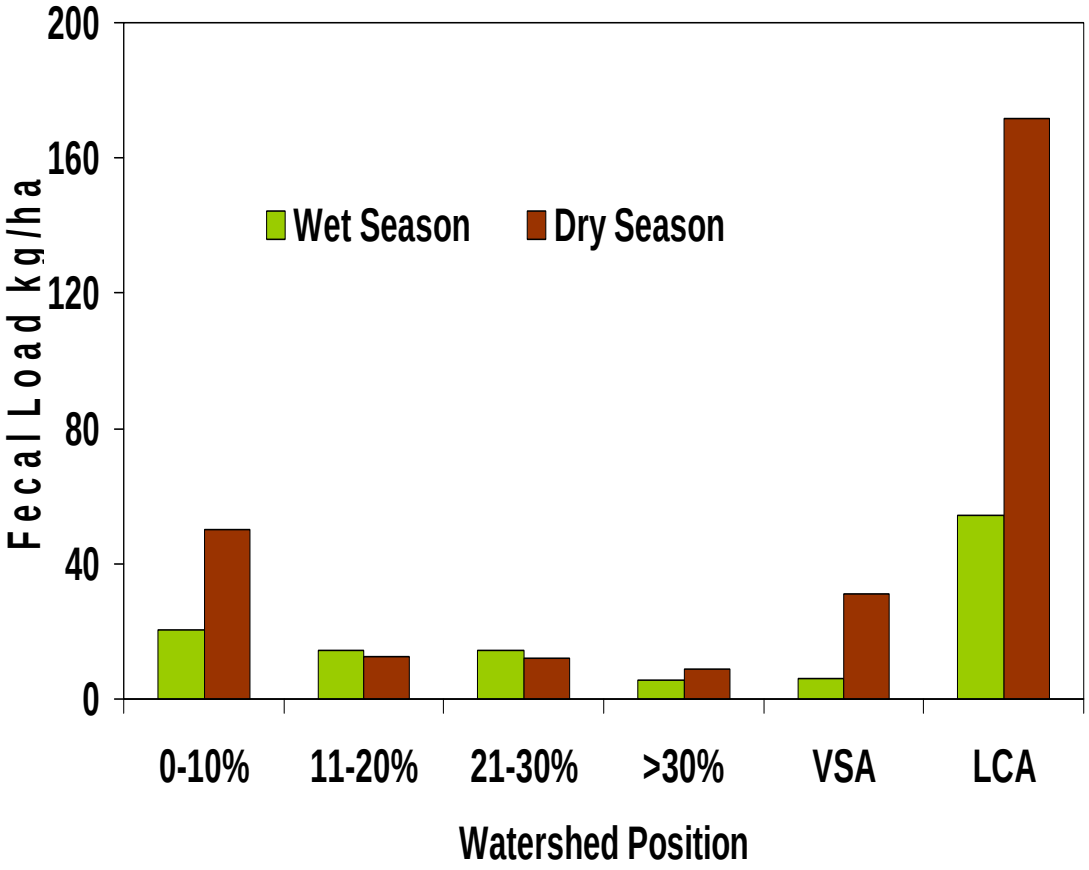


>90% trapped at fecal pat

30-99% trapped every 1 yard of travel distance

Keep it out of the creek

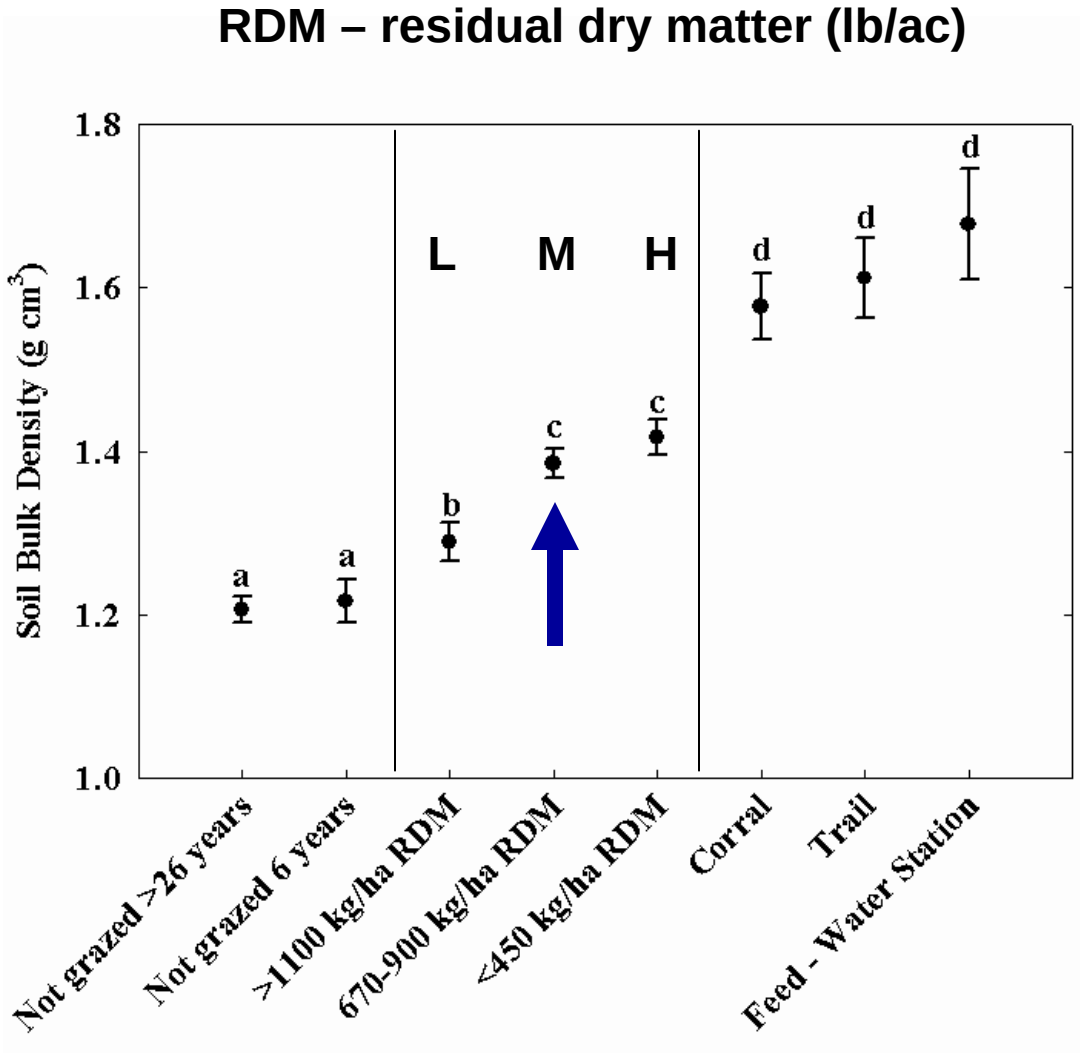
Fecal loading rates are dependent upon season, watershed position, & management.



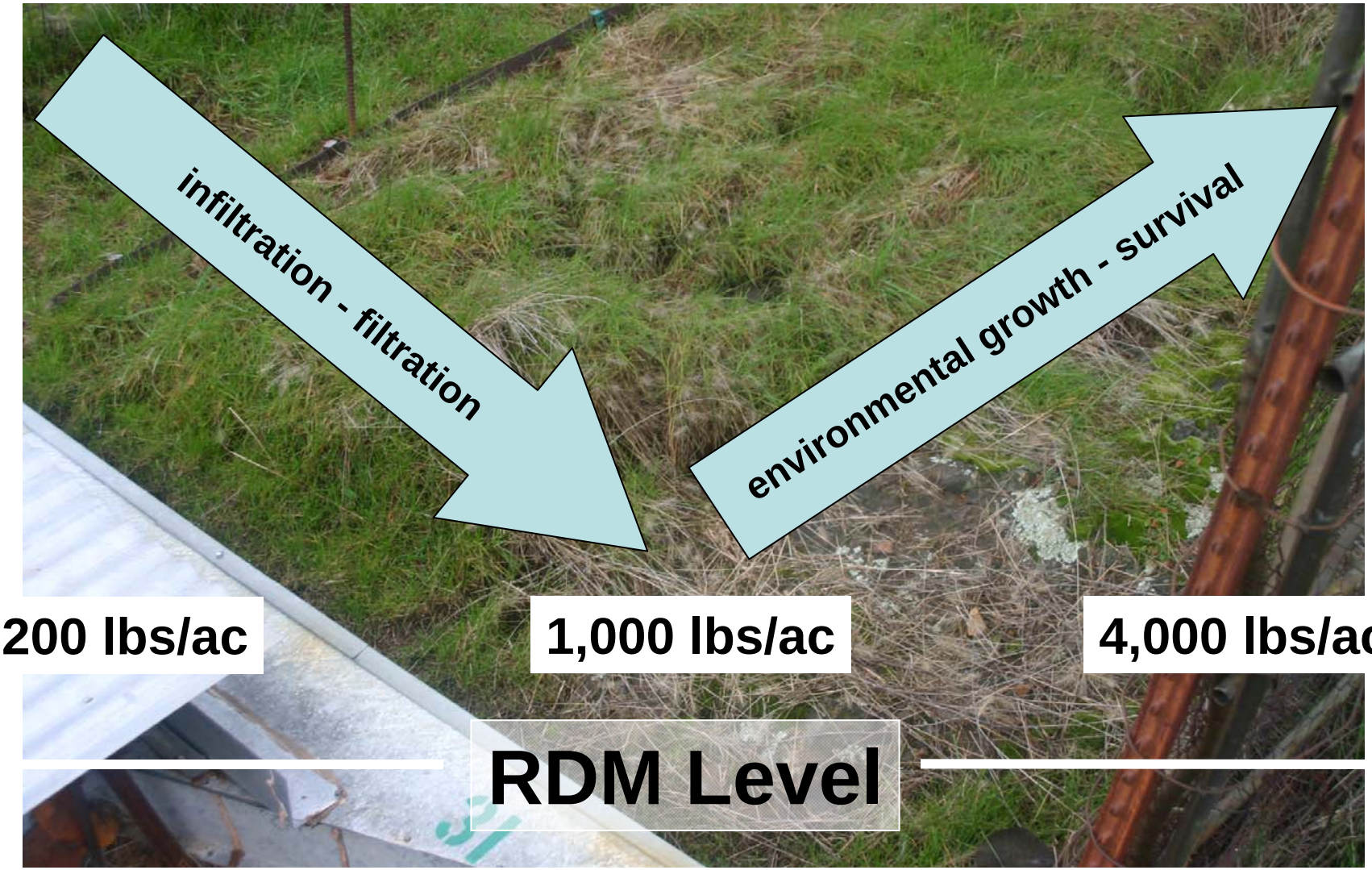
Do you know where is your supplement is?

- Move existing supplement and water sites out of near-stream locations.
- Evaluate trails leading to and from existing and proposed sites – do they link site to surface water?

Appropriate grazing pressure to maintain soil surface infiltration rates and natural buffering capacity.



E. coli flux decreased from 200 to 1,000 lb/ac forage cover, but increased from 1,000 to 4,000



Irrigated Pasture

- Reduce runoff rates
- Moderate stocking rates
- Remove cattle before irrigation – allow mortality/crusting
- Avoid direct in-stream fecal/urine deposition

Annual Range

- Moderate stocking rates
- Use livestock attractants to distribute livestock away from streams
- Avoid direct in-stream feces and urine deposition
- Timing of pasture use – allow mortality/crusting