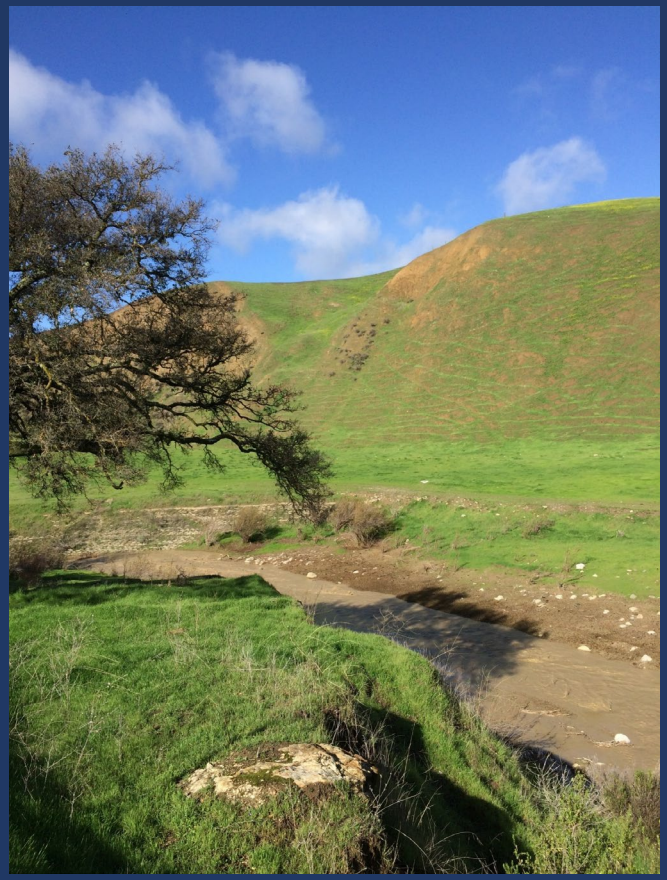
Monterey County Water Resources Agency
September 5, 2019, Paso Robles



Rangeland Water Quality & Erosion Prevention

Devii Rao
Livestock and Natural Resources Advisor

University of California
Agriculture and Natural Resources

Partnership included stakeholders such as

- Ranchers
- University of California
- NRCS
- Regional water boards
- Many others

Led to Ranch Water Quality Plans

Then GRAP came along

STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER QUALITY
NONPOINT SOURCE PROGRAM

California Rangeland Water Quality Management Plan

July 1995

Sediment

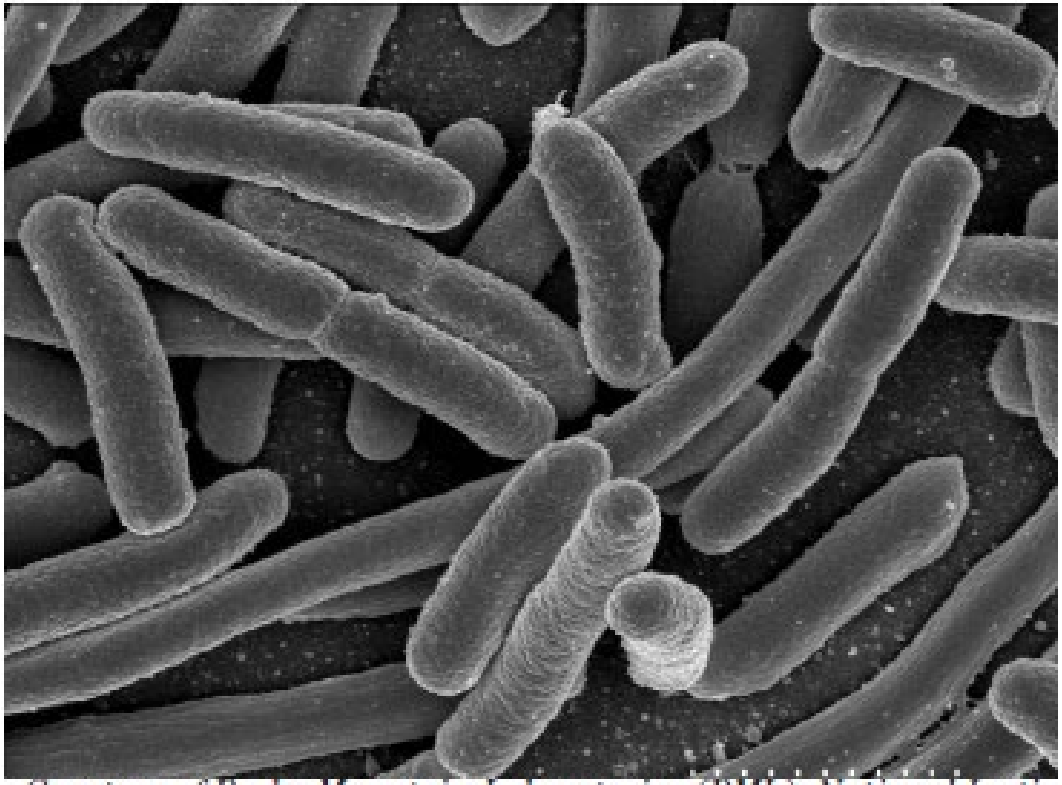
http://calag.ucanr.edu/Archive/?article=ca.v055n04p32

Nutrients: nitrogen, phosphorus can increase algae

http://rapidcityjournal.com/news/spring-creek-homeowner-worries-about-cattle-in-water/article_97ae0c38-206d-58d1-bb45-7af1aba8afdc.html

Pathogens, e.g. e. coli, cryptosporidium

Figure 5 Scanning electron micrograph of *Escherichia coli*, grown in culture



Courtesy of Rocky Mountain Laboratories (RML), National Institute of Allergy and Infectious Diseases (NIAID), National Institutes of Health (NIH)

http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=32935.wba

Livestock Management Strategies

Reduce sediment

- Graze at moderate stocking rates
- Improve livestock distribution to take advantage of underutilized areas
- Move cattle to less compactible soils in the wet season

Reduce nutrients and pathogens

- Strategically place water troughs, salt and minerals away from water
- Maintain vegetated buffer strips

Reduce all 3 (sediment, nutrients, and pathogens)

- Develop riparian pastures
- Permanently or seasonally exclude cattle from riparian areas
- Herding cattle

I want you to think about…

- How feasible are each of these practices?
- Would any of these practices be beneficial for your operation beyond just water quality?
- Are you already doing any of these practices?
- Are you doing other things to decrease erosion and improve water quality?

Moderate Grazing

http://anrcatalog.ucanr.edu/pdf/8092.pdf

Light Grazing

http://anrcatalog.ucanr.edu/pdf/8092.pdf

Heavy Grazing

http://anrcatalog.ucanr.edu/pdf/8092.pdf

Improve Livestock Distribution

Improve Distribution

http://anrcatalog.ucanr.edu/pdf/8217.pdf

Move Cattle to Less Compactible/Erodible Soils

✔ Carefully manage livestock grazing in riparian areas to ensure that adequate plant cover remains and bank trampling is minimized.

Inset: Unmanaged grazing often leads to streambank trampling, lack of vegetation and nutrient and sediment delivery to the stream.

http://clean-water.uwex.edu/pubs/pdf/pastures-riparian.pdf

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Strategic Placement of Cattle Attractants to reduce nutrients and pathogens

A Scientific Assessment of the Effectiveness of Riparian Management Practices by George et al. 2011

Effectiveness of nutrient supplement placement for changing beef cow distribution by George et al. 2008

http://cetehama.ucanr.edu/?impact=663&a=0

Maintain Vegetated Buffers to reduce nutrients and pathogens

"…vegetated buffer strips of only 1 to 2 meters in length comprised mostly of California annual grassland at slopes of 5 to 25 percent retained 90 to 99.99 percent of *E. coli* and *C. parvum* in bovine fecal pats from discharging in surface runoff." – Atwill et al. 2012

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Riparian Pasture

Seasonally Exclude Cattle From Riparian Areas

http://www.grit.com/animals/electric-fencing-basics.aspx?SlideShow=1

Permanent Riparian Fencing

http://www.shropshirehillsaonb.co.uk/aonb-partnership/rivers/

Cattle Crossing

Off-Stream Drinking Water, NRCS can help

http://spurx.com/?page_id=192

Herd Cattle to Less Sensitive Areas

http://focusranch.com/a-real-working-cattle-ranch/

Now that we've talked about a bunch of practices…

- How feasible are each of these practices?
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Thank You