Non-point source pollution (Erosion)/ water quality regulations

Rangeland Management and
Erosion Prevention Workshop
Thursday, September 5, 2019
Heritage Ranch

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UC Cooperative Extension

“Whiskey is for drinking; water is for fighting over."

attributed to Mark Twain,

Introduction to:

Non-Point Source Pollution

Water Quality Laws

In the following line of letters, cross out six letters so that the remaining letters, without altering their sequence, will spell a familiar English word.

BSAINXLEATNTEARS

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BSAINXLEATNTEARS

BANANA

What is Water Pollution?

Beneficial Use Changed

"An alteration of the quality of the states waters by waste to a degree which unreasonably affects their beneficial uses or facilities which serve their beneficial uses".

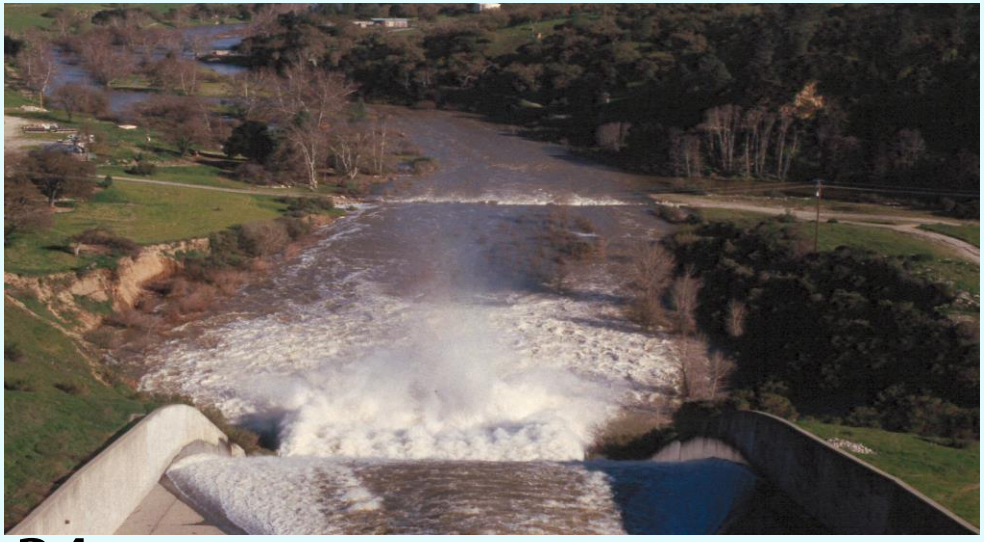
Substance In Water

The presence in a body of water of a substance in such quantities that it impairs the body's usefulness or renders it offensive to the senses of sight, taste, or smell.

From: Article 10. Definitions, CCR, Title 23, Division 3, Chapter 15

Beneficial Uses

The benefits that society gains from a water body. Water body = rivers, streams, lakes, reservoirs, estuaries, bays, groundwater, etc.

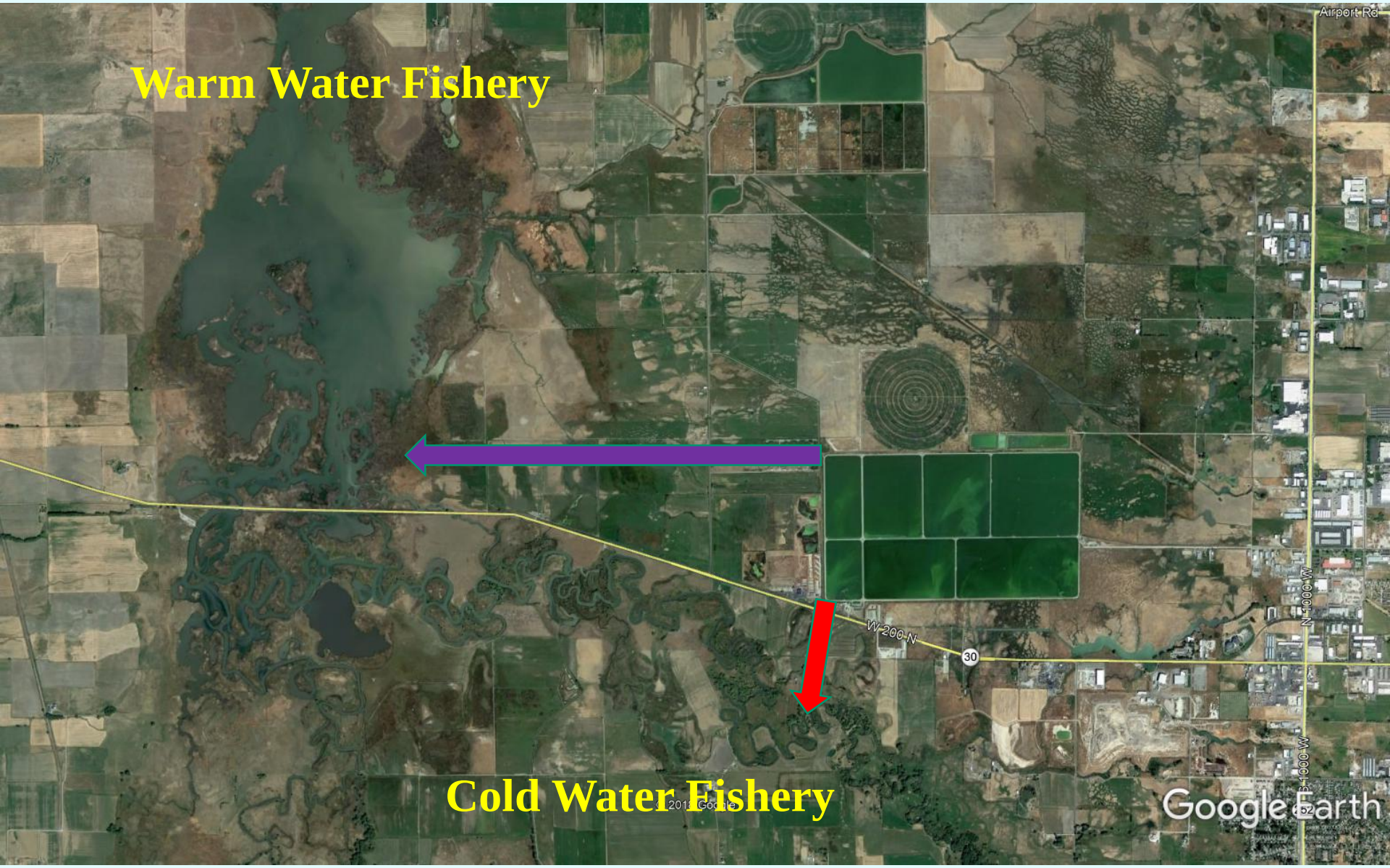


Qualitative and
Quantitative
Standards

24 Beneficial Uses

Municipal & Domestic, Agricultural, Industrial process, Industrial Service, Ground Water Recharge, Freshwater Replenishment, Navigation, Hydropower Generation, Water Contact Recreation, Non-contact Water Recreation, Ocean Commercial and Sport Fishing, Aquaculture, Warm Freshwater Habitat, Cold Freshwater Habitat, Inland Saline Water Habitat, Estuarine Habitat, Marine Habitat, Wildlife Habitat, Preservation of Biological Habitats of Special Significance, Rare Threatened or Endangered Species, Migration of Aquatic Organisms, Spawning Reproduction and Early Development, Shellfish Harvesting. SWRCB

Beneficial Use Example of warm water versus cold water designations



A Substance in Water

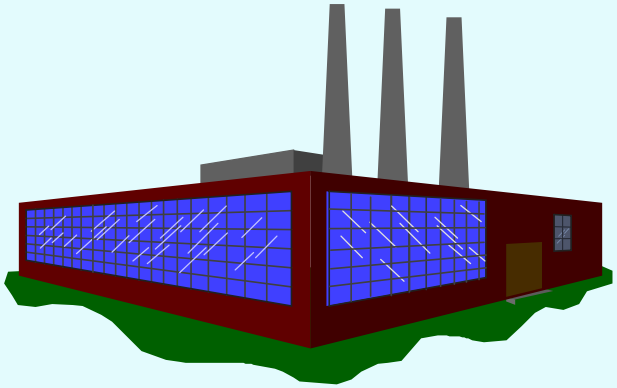
- Sediment / Erosion
- Nutrients
- Pathogens
- Elevated Water Temperature

- Pesticides/Herbicides
- Toxins (MTBE)
- Salts (TDS)
- Trace Elements
- Suspended Solids
- Heavy Metals
- Low Oxygen (BOD)
- Others

Example for Drinking Water

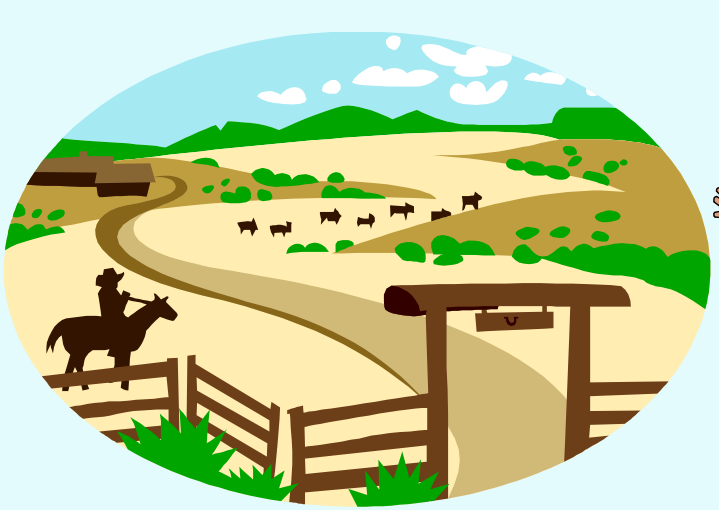
- Nitrate (NO_3-N) = 10 mg/l
- 2,4D = 0.07 = 10 mg/l
- Glyphosate = 0.7 mg/l
- E. coli = <5% positive samples, > 40 samples/month

http://www.epa.gov/safewater/contaminants/index.html



Point Source

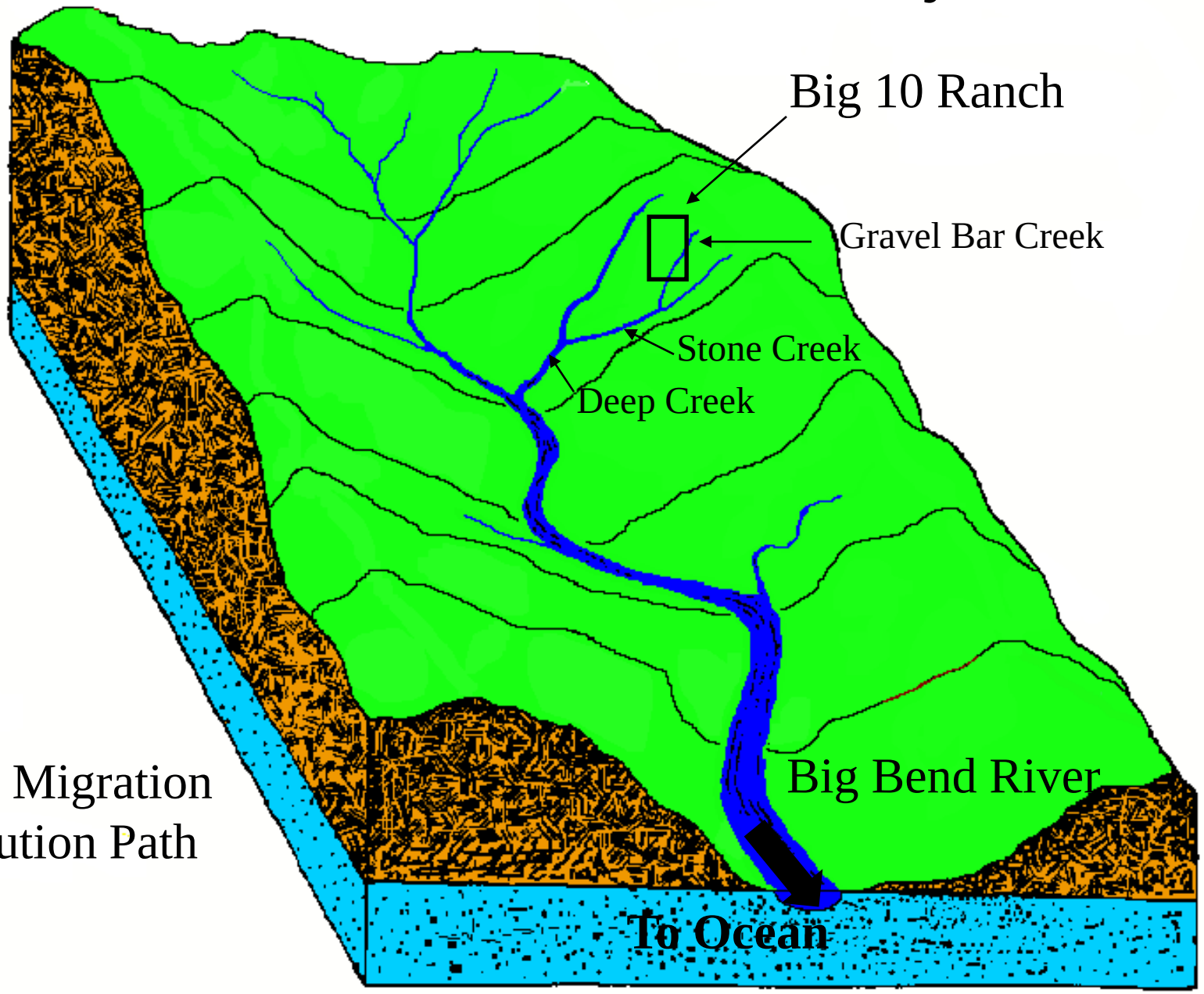
"an observable, specific, and confined discharge of pollutants into a water body " (food processing plants, sewage treatment plants, **CAFO (feedlots), etc.)**



Non-point Source

"diffuse discharges of pollutants throughout the natural environment" such as **ranches, farms, etc**

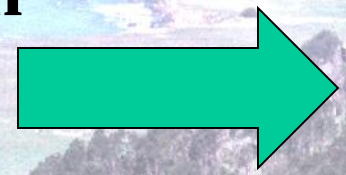
Water Pollution Pathway



Fish Migration
Pollution Path
Etc.

NPS Pollution and the Ranching Industry

Waste Concentration
Hoof Impacts
Heavy Grazing

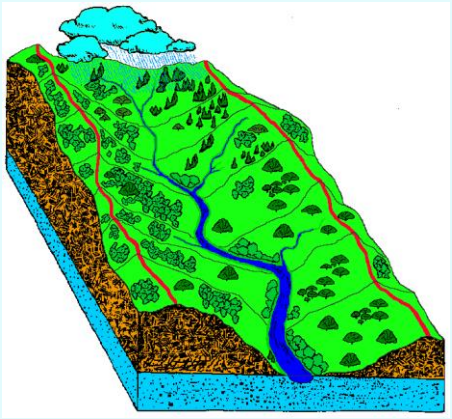


Erosion/Sedimentation
Nutrients
Pathogens
Water Temperature
Other

Water has both Potential and Kinetic Energy

The Big E to consider is Kinetic Energy

Kinetic Energy = ½ mv^2 (Velocity Squared – it is an exponential relationship)



Capture, Store, Safe Release

Watersheds Have to Resist Energy From Rain Drops, Surface Runoff & Stream Flow

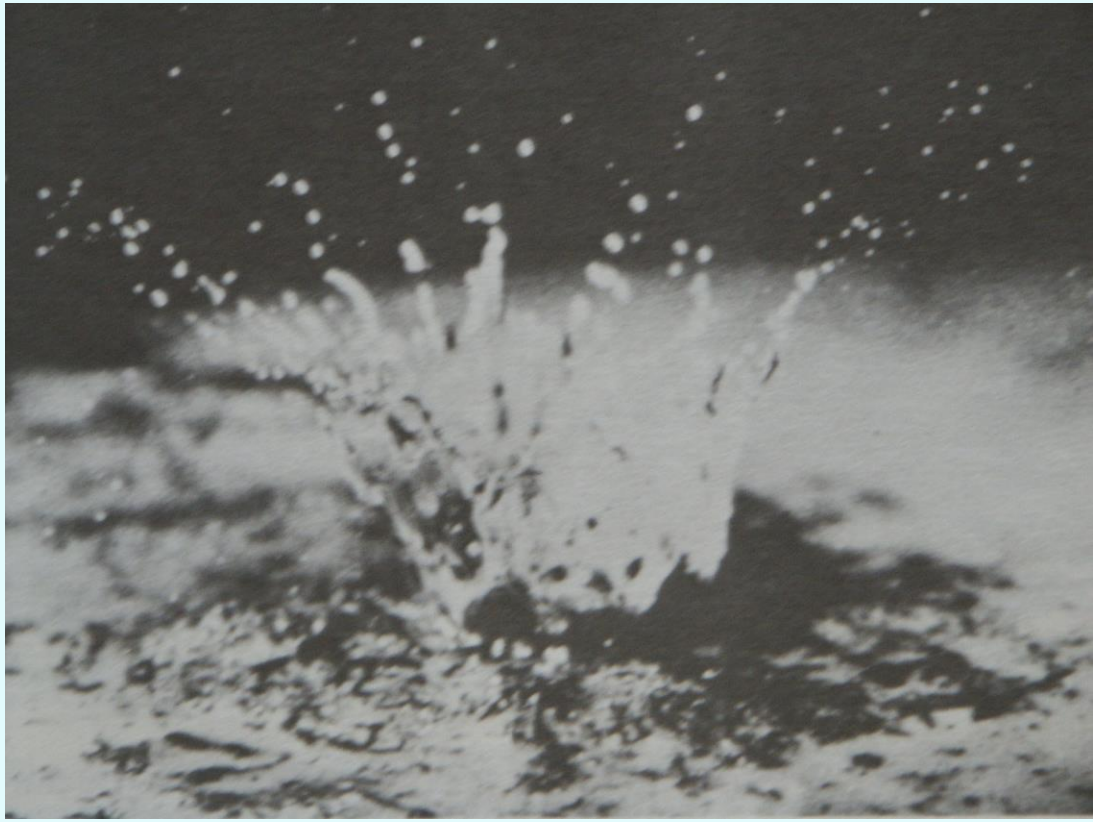
Anything the causes water to runoff and concentrate, increases velocity.

Energy in Rain Drops

1 inch of rain in 1 hour produces 1,800,000 ft lbs of energy per acre.

1). Little explosions dislodge and force soil particles upward

2). Raindrop impact helps to seal the soil surface decreasing infiltration and increasing concentrated surface flow



Splash Erosion

Accelerated Erosion - Sedimentation

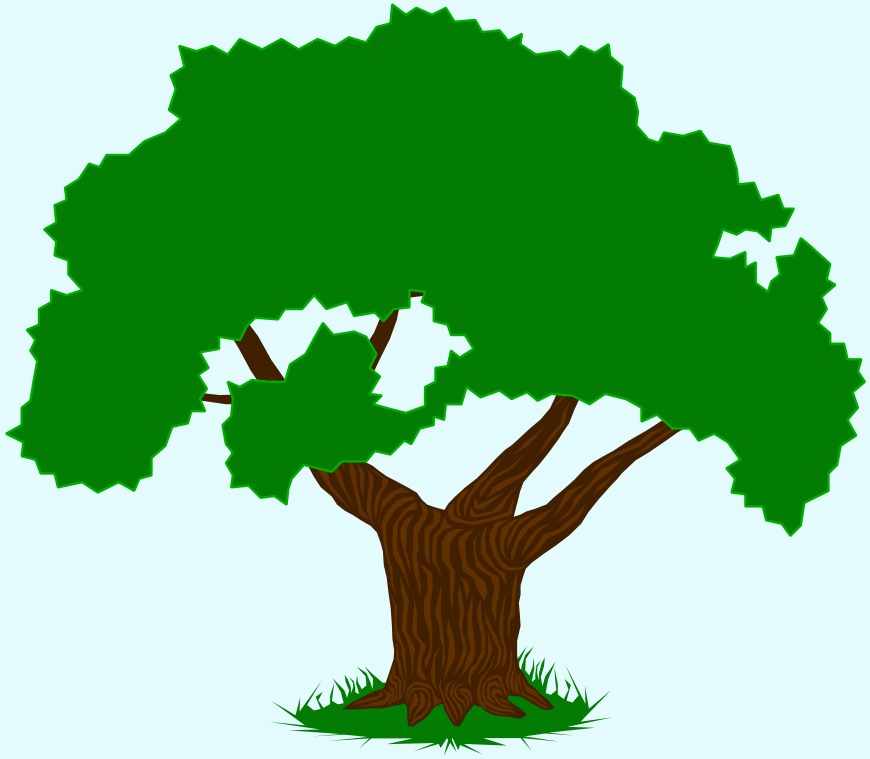
California's soil is eroding about 80 times faster than it can be formed. G. Miller Jr. Living in the Environment. 1989

Nutrients and Pathogens

(See section 2, fact sheet 17)

Nutrients

- **Nitrogen**
  - **Nitrate**
  - **Nitrite**
  - **Ammonia**
- **Phosphorus**
- **Potassium**



If some nutrients are good, are more better?

Pathogens

Viral - Hepatitis, Foot and Mouth Disease, New Castle, Hog Cholera, Psittacosis, WNV,

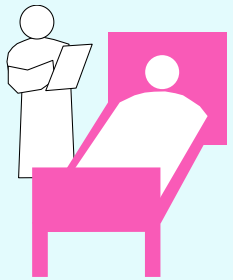
Fungal - Coccidioidomycosis, Balantidiasis, Toxoplasmosis

Bacterial - Salmonella, E. Coli O157:H7, Listeriosis, Tuberculosis, Anthrax, Johnes Disease, Brucellosis, Tetanus, Tularemia, Erysipelas, Colibacilosis, Leptospirosis

Protozoal - Giardia, Cryptosporidiosis, Coccidiosis, Toxoplasmosis,

Related to Grazing and the Food Industry

Some Potential Water-Borne Diseases



Livestock Concentration Can Lead To Nutrient / Pathogen Problems

(CAFO – Point Source)

Consider:
Herd health program
Location of corrals,
Supplemental feeding areas,
Water troughs
Fencing,
Timing

Water Quality Laws

Water Quality Laws

All water within the State is the property of the people of the State, but the right to the use of water may be acquired by appropriation in the manner provided by law.

California Water Code, Division 1, Chapter 1, Section 102.

Water Quality Laws

- **Federal Laws**

  EPA, NOAA Fisheries (NMFS), USFWS, Army Corp

- **State Laws**

  SWRCB, RWQCB, DFG, CDF, Coastal Commission

- **Local Laws**

  Counties (grading, pesticides/herbicides, wells, ground water)

Federal Laws

- **1972 Clean Water Act (Discharges to Surface Water)**
- **1972 Coastal Zone Management Act**
- **Endangered Species Act**

Clean Water Act - 1972
(Federal Water Pollution Control Act)

- **Section 208:** directs states to develop NPS assessment and control programs, BMPs.
- **Section 303:** requires states to establish water quality standards and identify beneficial uses for water bodies.
- **Section 304:** directs EPA to provide water quality criteria to states to help establish their standards.
- **Section 305(b):** requires states to report to EPA, Congress and citizens on water quality of states water bodies.
- **Section 319: added in 1987**, reemphasizes NPS mandate of Section 208 and grants for implementation of NPS projects.
- **Section 404:** regulates wetlands as “waters of the US”.

Endangered Species Act

- **jointly administered by NOAA Fisheries (NMFS) and the U.S. Fish and Wildlife Service (USFWS)**
- **provides the basis for protection of plants, insects, fish and wildlife that are listed as threatened or endangered.**
- **NOAA Fisheries has the responsibility for Pacific anadromous salmonids and USFWS takes lead for terrestrial and freshwater species.**

State Laws

- **1969 Porter-Cologne Act (CA Water Code (CWC)- Discharges to Surface and Ground Water)**
- **1976 Coastal Act**

California Porter-Cologne Act – 1969 Gave SWRCB & RWQCB Authority

(Principal Law Governing WQ Control In CA)

- Planning Authority – Beneficial Uses
- Administrative Permitting (WDR, Waivers, or Prohibitions)
- Enforcement Options
- CRWQMP 1995

Policy for Implementation and Enforcement of the Non-Point Source Pollution Control Program.

- 1988 States First NPS Program Plan

- 1999 Upgraded 1988 plan. To be in compliance with 1987 Sec 319 of CWA (Fed) and 1990 Sec 6217 CZARA
  - Set in motion the irrigated ag conditional waiver

- SB 390 (1999) & SB 923 (2003) Significantly amended requirements applicable to waivers
  - Changed the conditional waiver for rangeland

- 2004 Policy adopted by SWRCB, fulfills CWC Sec. 13369 (a)(2)(B)


Some areas have real problems
Some areas have perceived problems
Some areas have no problems

June , 1804
Lewis & Clark Expedition
Confluence of the Missouri
And Kansas Rivers.

June 17, Clark wrote “The party is much aflicted with boils and several have the decissentary, which I contribute to the water which is muddy”. The captains urged the men to dip their cups below the surface when they go for a drink of water. The surface was full of scum, mud and debris; if the men dipped deep they would get cleaner water.

June 24, Lewis weighed the water of the two rivers and found the Missouri’s to be heavier, meaning it carried more mud.

Stephen E. Ambrose; Undaunted Courage