California Irrigated Lands Program

Upper Feather River Watershed Monitoring

SWRCB Prop 50 Project

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Cooperative Extension
Plumas-Sierra County

Background

- **1982 – Waste Discharge Waiver Requirements**
  - Conditions, lack of resources, ? Compliance, passive
- **2003 – RWQCB Irrigated Lands Program**
  - Required monitoring & reporting of ‘discharge’
- **2004 - UFRW Group (Sac Valley Coalition)**
  - Response to requirements of ILP
- **Fall 2004 – UCCE worked with locals**
  - Applied for 3-year SWRCB Prop. 50 grant
- **2005 - Grant approved ($787,820)**
  - Contract signed & work began in Jan. 2006
  - No Cost Extension thru March 2009

Chart of Major Irrigated Agriculture Water Quality Players in the Upper Feather River Watershed

If you did not join a coalition before Dec. 31, 2006, you must contact the Regional Board (916/464-4611) and request to be evaluated on a case-by-case basis to determine if you must get an individual waiver or permit or if you may join a coalition.
Info about the ILP & application forms are on the Internet: *http://www.waterboards.ca.gov/rwqcb5/water_issues/irrigated_lands/forms/index.html*

Irrigated Agriculture Landowners

Upper Feather River Watershed Group (UFRWG)

Carol Dobbas – Executive Director

Upper Feather River Watershed Prop. 50 Project Team

Holly George – Team Leader, UCCE

Sacramento Valley Water Quality Coalition (NCWA, Ducks Unlimited, CURES)

Tina Lunt
http://www.svwqc.org

California Regional Water Quality Control Board – Central Valley Region
IRRIGATED LANDS PROGRAM

Jodi Pontureri

State Water Board

The State Water Board has four major programs:

Water Quality: in coordination with the Regional Water Boards the State Board works to preserve, protect, enhance and restore water quality.

Financial Assistance: loans & grants

Water Rights: the State Board issues permits for water rights specifying amounts, conditions & construction timetables for diversion and storage.

Enforcement: the State Board and nine Regional Water Quality Control Boards are responsible for the swift and fair enforcement when the laws and regulations protecting our waterways are violated. They also work with federal, state and local law enforcement to ensure a coordinated approach to protecting human health and the environment.

What the Regional Water Quality Control Boards do:

There are nine regional water quality control boards statewide. The nine Regional Boards are semi-autonomous and are comprised of nine part-time Board members appointed by the Governor and confirmed by the Senate. Regional boundaries are based on watersheds and water quality requirements are based on the unique differences in climate, topography, geology and hydrology for each watershed. Each Regional Board makes critical water quality decisions for its region, including setting standards, issuing waste discharge requirements, determining compliance with those requirements, and taking appropriate enforcement actions.

Names based on presenters at November 15, 2007
UFRW Prop 50 Stakeholder Meeting, Quincy

Project Objectives

- *Interact with local agriculture landowners (ongoing)*
- Compile info on UFRW irrigated Ag Practices (2006)
- Monitor ambient WQ, ‘bracketing agriculture’ in 4 major valleys (Phase I - years ’06-07)
- On-ranch monitoring to understand ‘constituents of concern’ and demonstrate effectiveness of management practices (Phase II – years ’07-08)
- Assist in developing management plans (ongoing)
- Education & outreach (ongoing)

Expected Benefits

- Improved water quality across the UFRW
- Continuation of viable agricultural economy, relieved of regulatory threat or punitive action

Upper Feather River Watershed

UCCE – Prop 50 – Phase 1

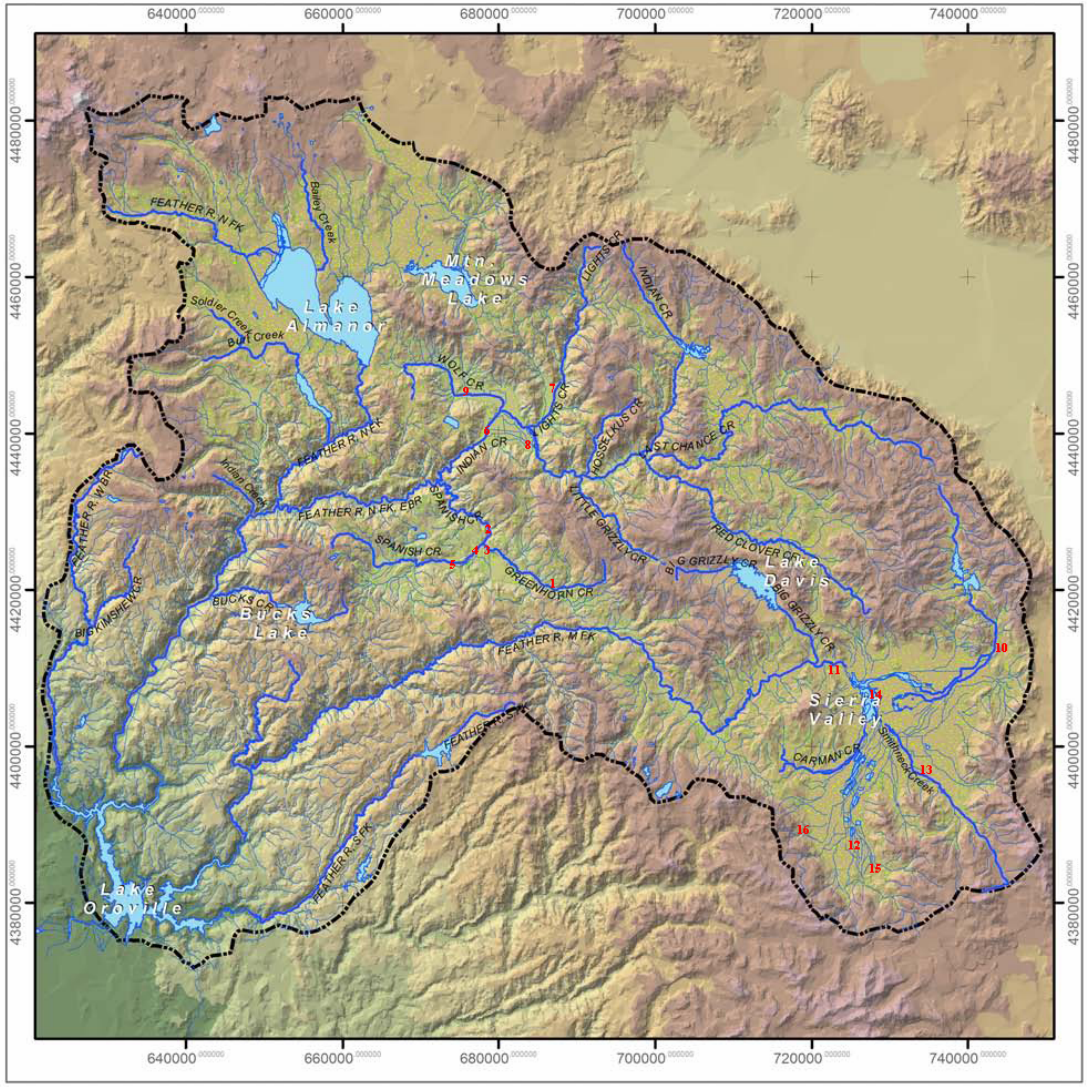
20 sites in four major agricultural areas

5 in American Valley

4 in Indian Valley

8 in Sierra Valley

3 on Goodrich Creek



Legend

- Streams
- Lakes and reservoirs
- Rivers
- Watershed Boundary

Elevation (m)

- 2719.143 - 3169
- 2269.286 - 2719.143
- 1819.429 - 2269.286
- 1369.571 - 1819.429
- 919.714 - 1369.571
- 469.857 - 919.714
- 20 - 469.857

FIGURE 1.2

UPPER FEATHER RIVER WATERSHED

N

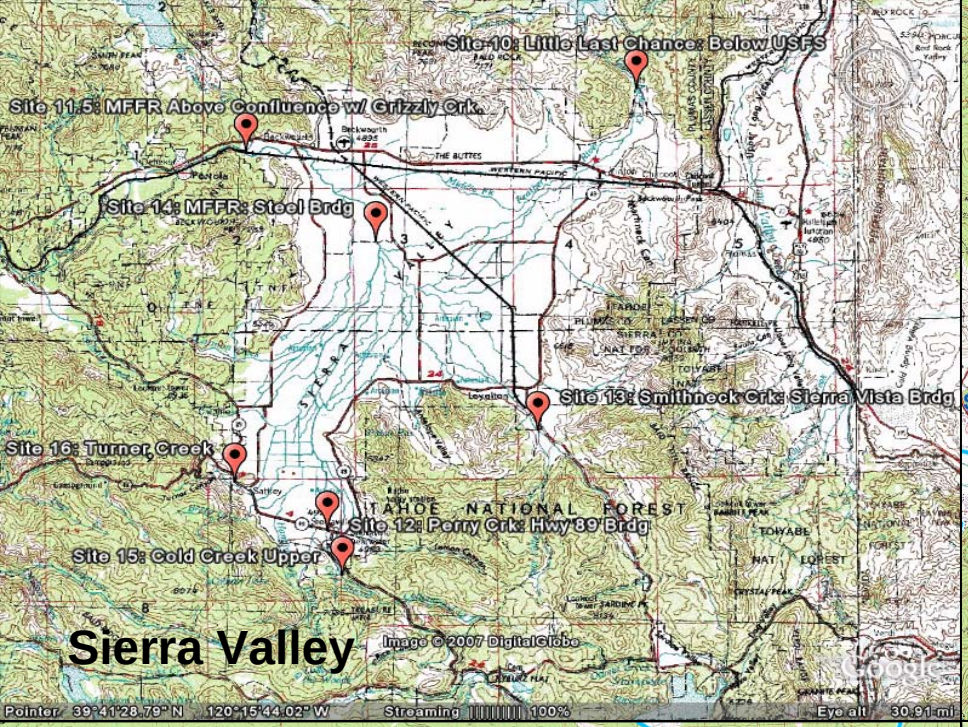
Watershed base map depicting elevation, major rivers, tributaries, streams, lakes and reservoirs.

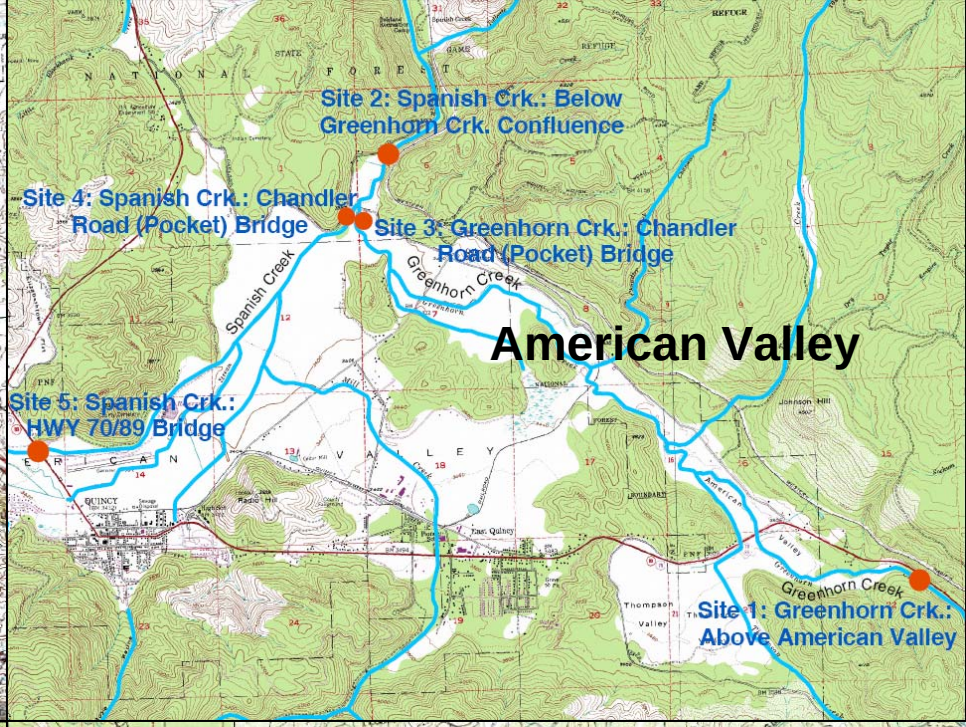
GIS Metadata Information
Rivers, streams, lakes and reservoirs shapefiles:
California Spatial Information Library CASIL
Feather River Watershed Elevation Grid:
Ecosystem Sciences

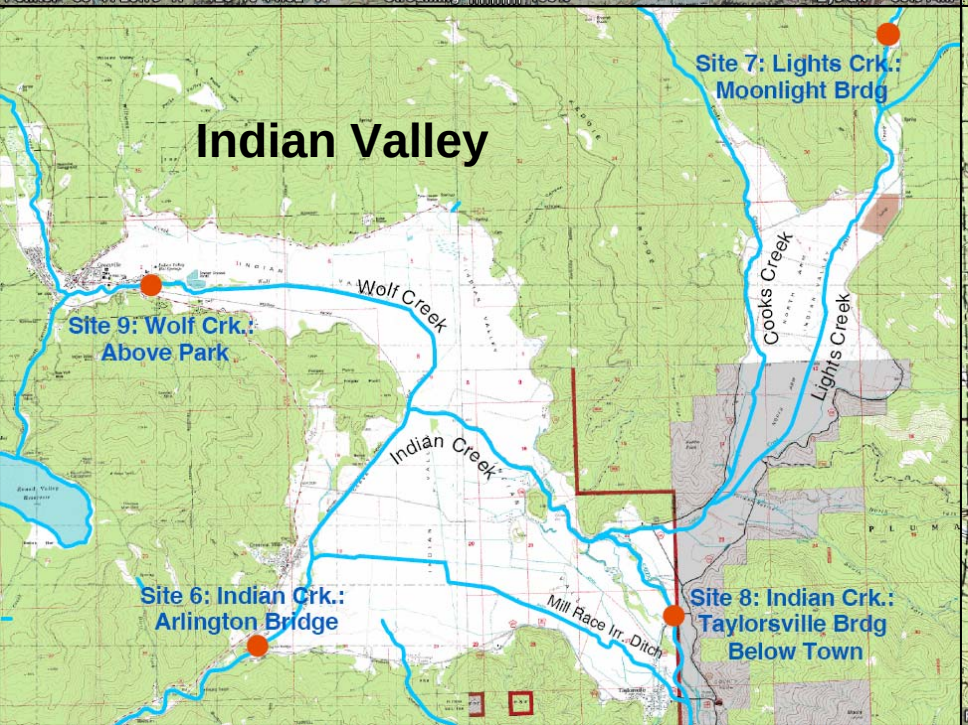
Phase I – 20 Sites – 4 Valleys

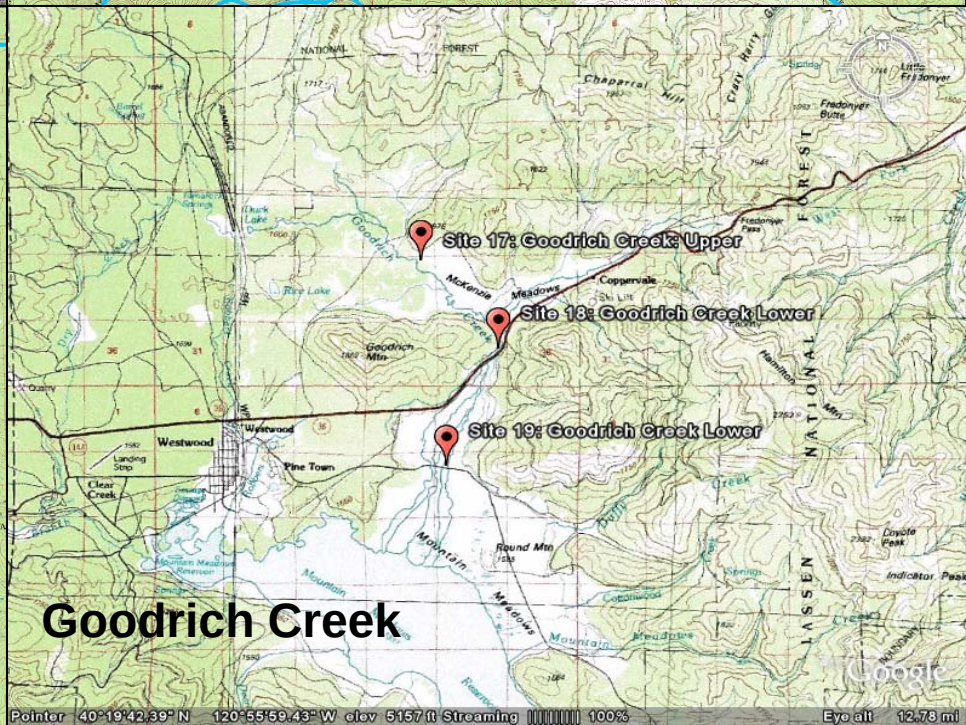
- **Located above & below major irrigated agriculture**:
  - Sierra Valley,
  - American Valley,
  - Indian Valley,
  - Goodrich Creek area

- **1 liter water grab sample:**
  - Sampled monthly April-October & two storm events/year
  - Lab: nutrient, metals, toxicity
  - Field measurements of Flow, Dissolved Oxygen, temperature plus photos
  - Macro-invertebrates 2X/yr


Site 10: Little Last Chance: Below USFS
Site 11.5: MFFR Above Confluence w/ Grizzly Crk.
Site 14: MFFR: Steel Brdg
Site 13: Smithneck Crk: Sierra Vista Brdg
Site 16: Turner Creek
Site 12: Perry Crk: Hwy 89 Brdg
Site 15: Cold Creek Upper
TAHOE NATIONAL FOREST
Sierra Valley
Image © 2007 DigitalGlobe
Pointer 39°41'28.79" N 120°15'44.02" W Streaming 100% Eye alt 30.91 mi


Site 2: Spanish Crk.: Below Greenhorn Crk. Confluence
Site 4: Spanish Crk.: Chandler Road (Pocket) Bridge
Site 3: Greenhorn Crk.: Chandler Road (Pocket) Bridge
Spanish Creek
Greenhorn Creek
American Valley
Site 5: Spanish Crk.: HWY 70/89 Bridge
Site 1: Greenhorn Crk.: Above American Valley


Site 7: Lights Crk.: Moonlight Brdg
Indian Valley
Wolf Creek
Site 9: Wolf Crk.: Above Park
Cooks Creek
Lights Creek
Indian Creek
Site 6: Indian Crk.: Arlington Bridge
Mill Race Irr. Ditch
Site 8: Indian Crk.: Taylorsville Brdg Below Town


Site 17: Goodrich Creek: Upper
Site 18: Goodrich Creek Lower
Site 19: Goodrich Creek Lower
Westwood
Goodrich Creek
Pine Town
Goodrich Mtn
Round Mtn
LASSEN NATIONAL FOREST
Pointer 40°19'42.39" N 120°55'59.43" W elev 5157 ft Streaming 100% Eye alt 12.78 mi

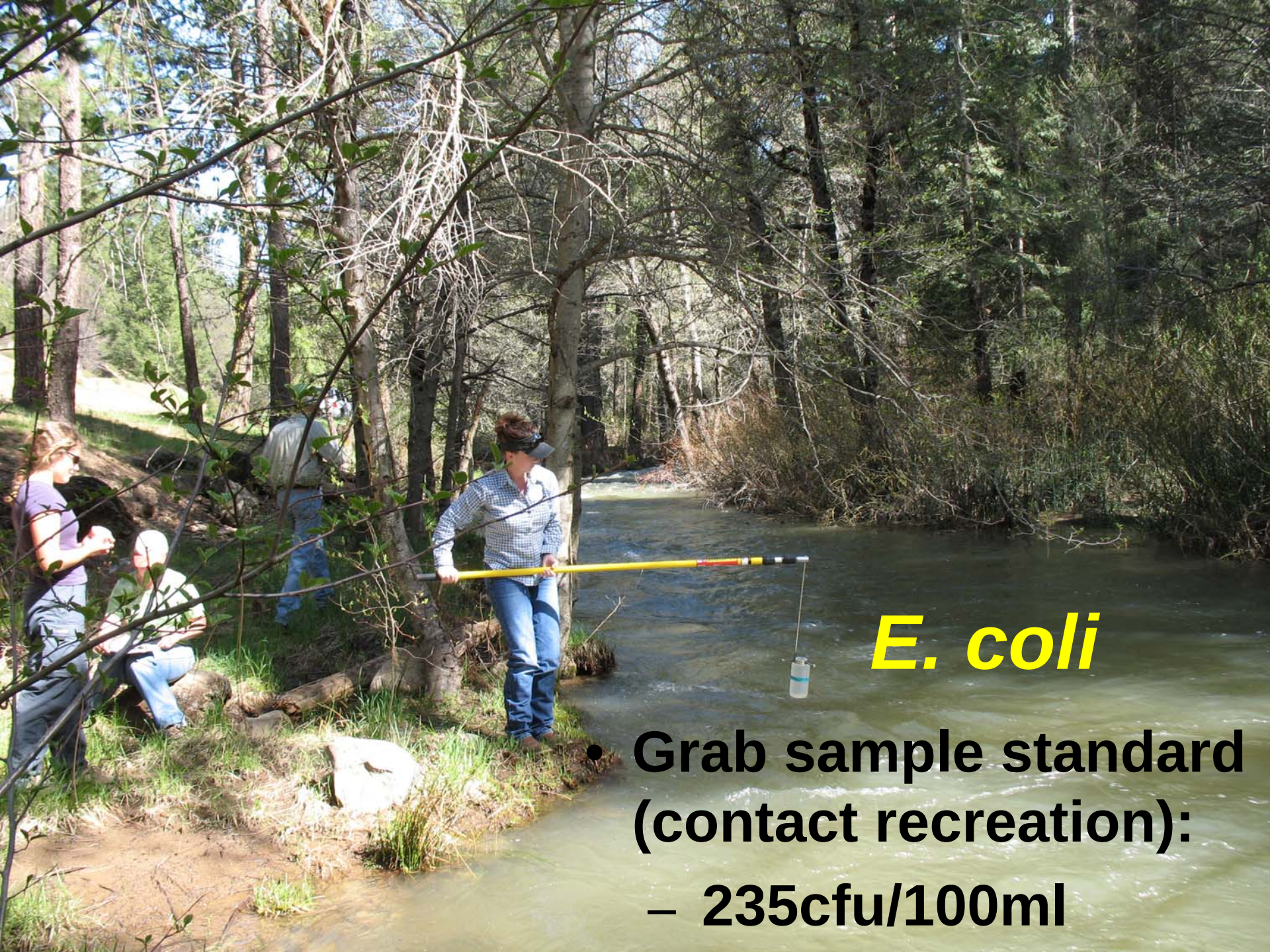
Constituents monitored

Constituent Monitored	Water Quality Limit
Total Nitrogen	NA
Nitrate-N	10 mg/L
Ammonia-N	25 mg/L
Total Phosphorous	NA
Phosphate-P	NA
Dissolved Organic Carbon	NA
Dissolved Oxygen	7 mg/L (coldwater fisheries)
Temperature	NA; (For Rainbow Trout <75°F)
Electrical Conductivity	150 Feather River; 700-900 for Ag. Program
pH	6.5-8.5 (Sierra Valley only…natural?)
Turbidity	NA (relative to background)
Total Suspended Solids	NA (relative to background)
E. coli	235 cfu/100mL
Metals	B (700ug/L); Al; Fe; Ni (100ug/L); Cu (10ug/L); Zn (5000 ug/L); As (10ug/L); Se; Cd; Pb
Toxicity	determined as % survivability

Phase 1 Sampling Summary

- **Nutrient & trace metal concentrations**
  - Below levels of concern
- **No regular toxicity observed (June 06 / May 07)**
  - 1x per month, outlet of each valley
- **Three years of WQ monitoring demonstrate limited water quality impacts**
  - E. coli ↑
  - Dissolved Oxygen (DO) ↓
  - Temperature ↑
  - pH (elevated bottom SV)

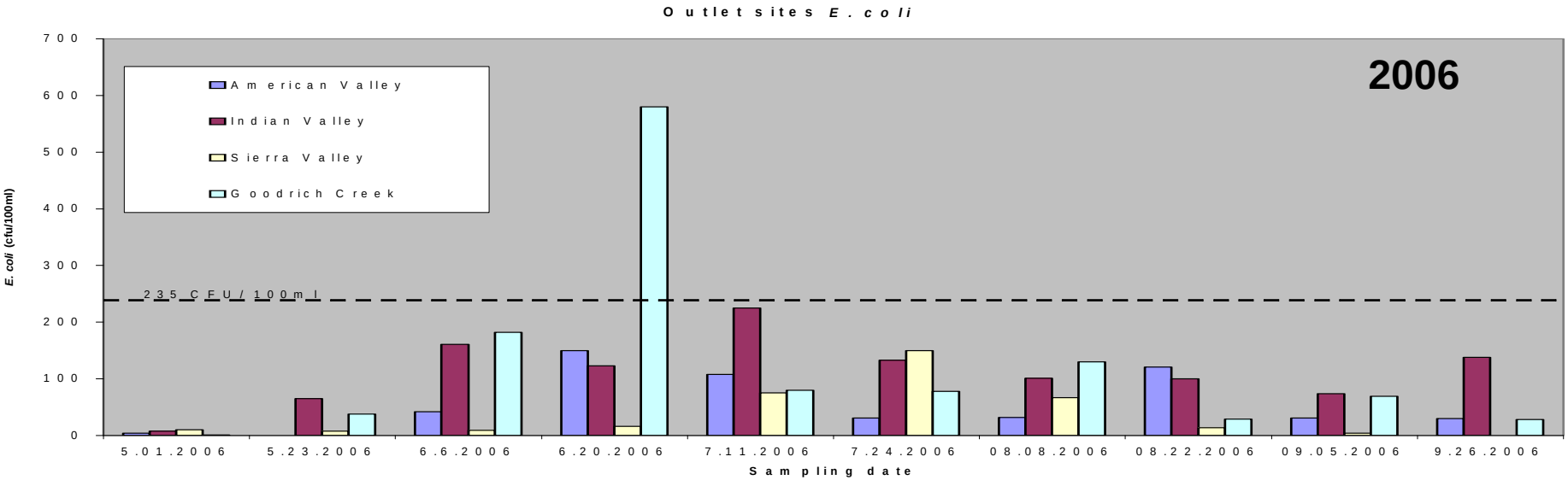
Saved locals thousands of dollars in WQ monitoring, reporting & outreach

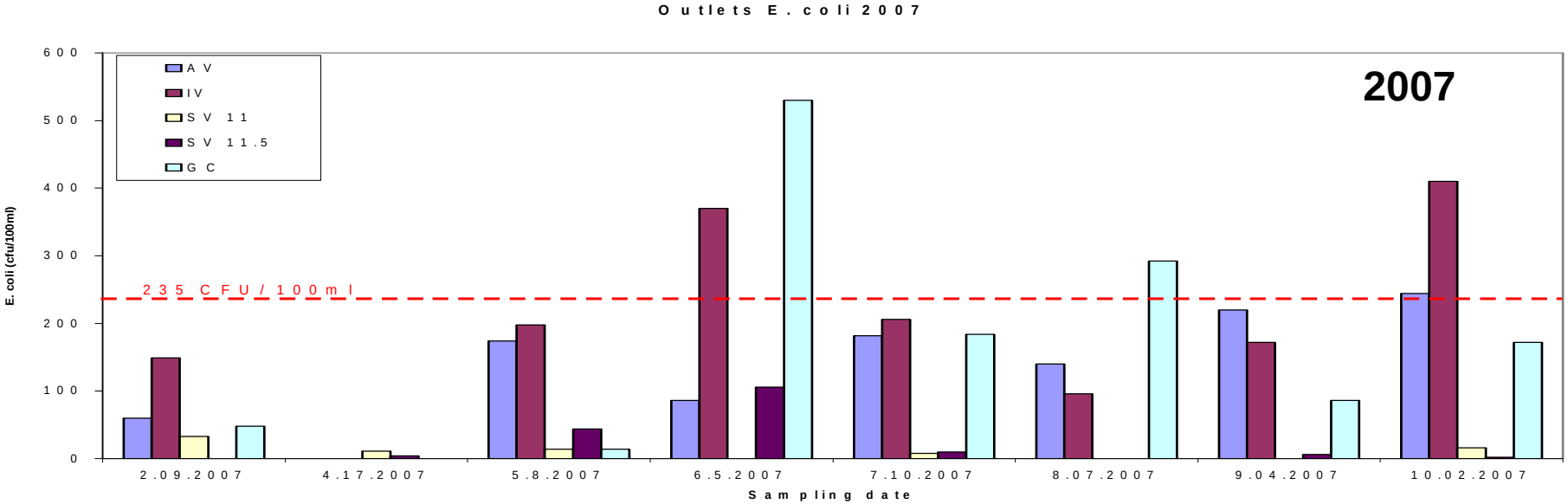


E. coli

- **Grab sample standard (contact recreation):**
  - **235cfu/100ml**

E. coli Outlets



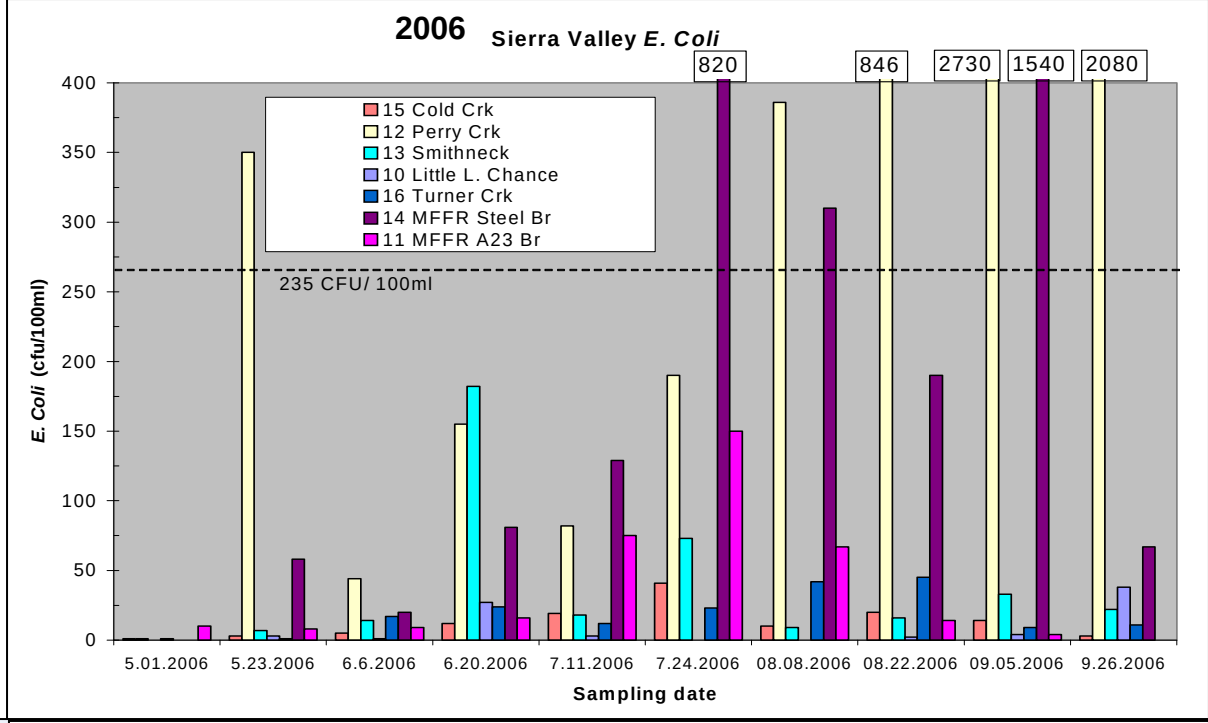


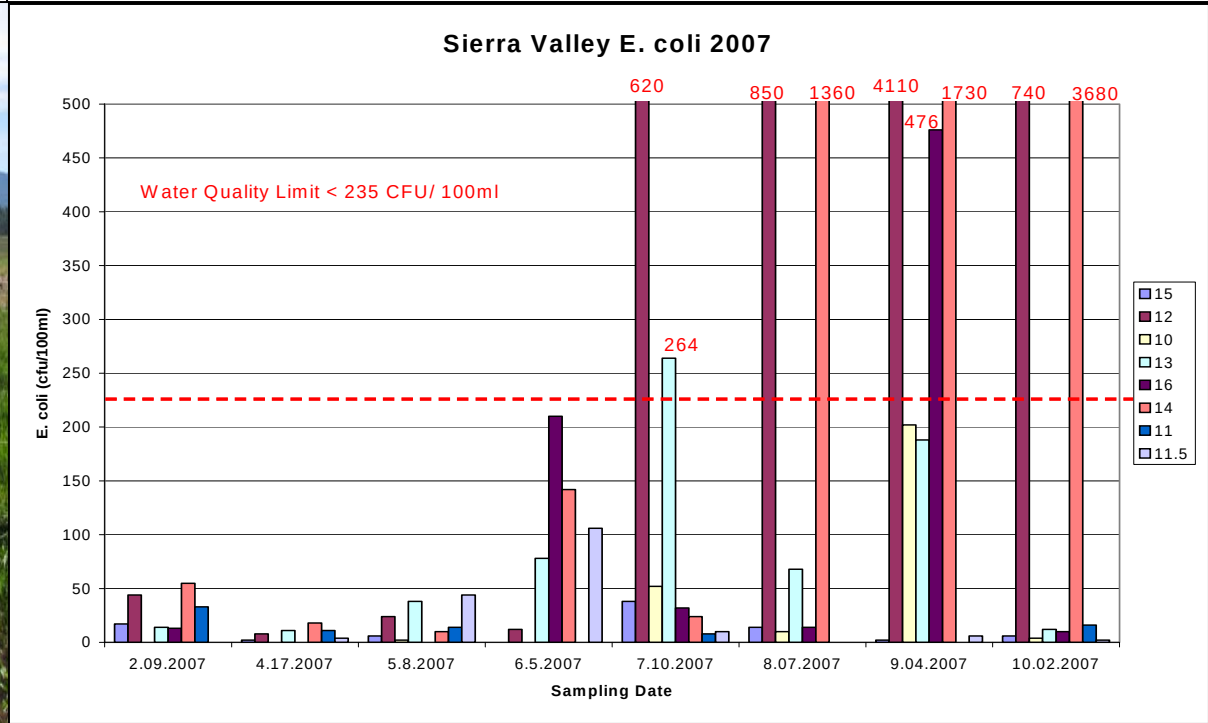
E. coli Exceedance Summary

Sierra Valley:

- 2006: 8 exceedances (11%)
- 2007: 9 exceedances (14%)

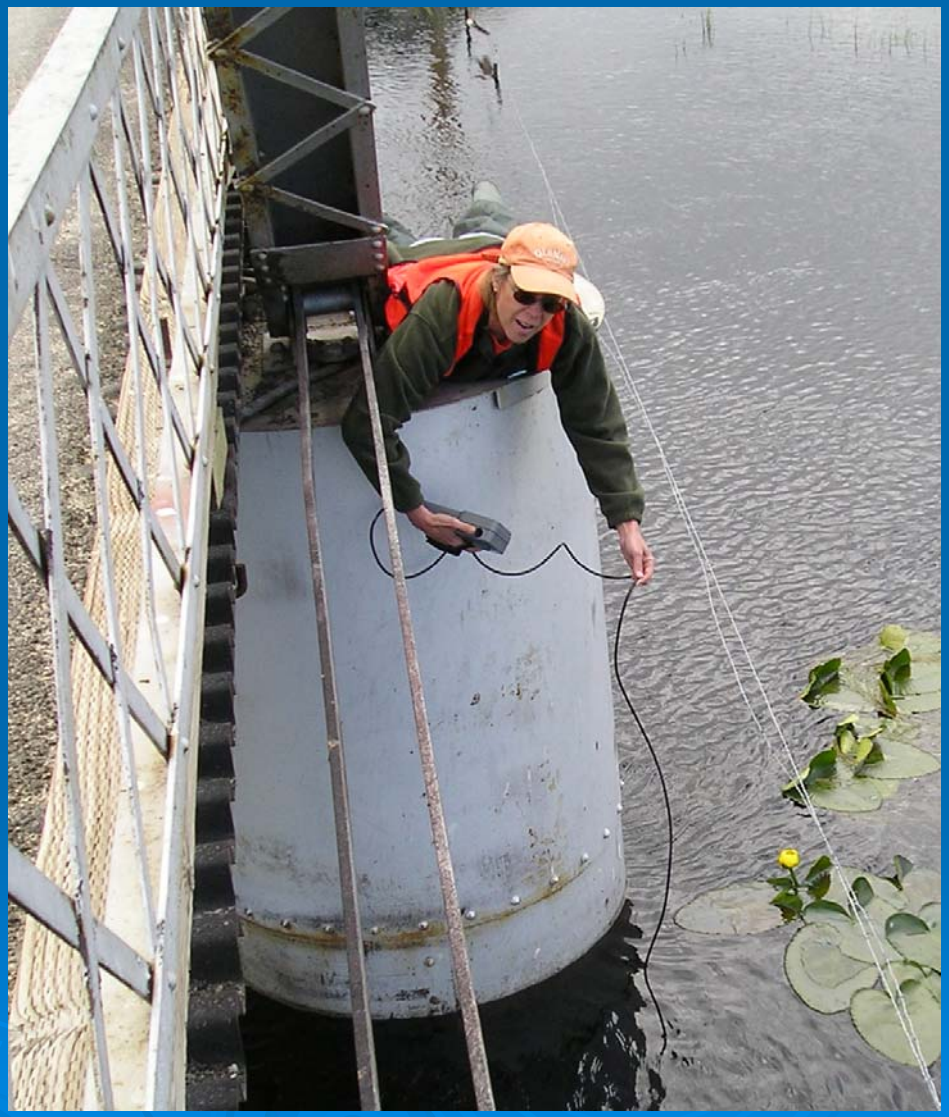
All were at above sites



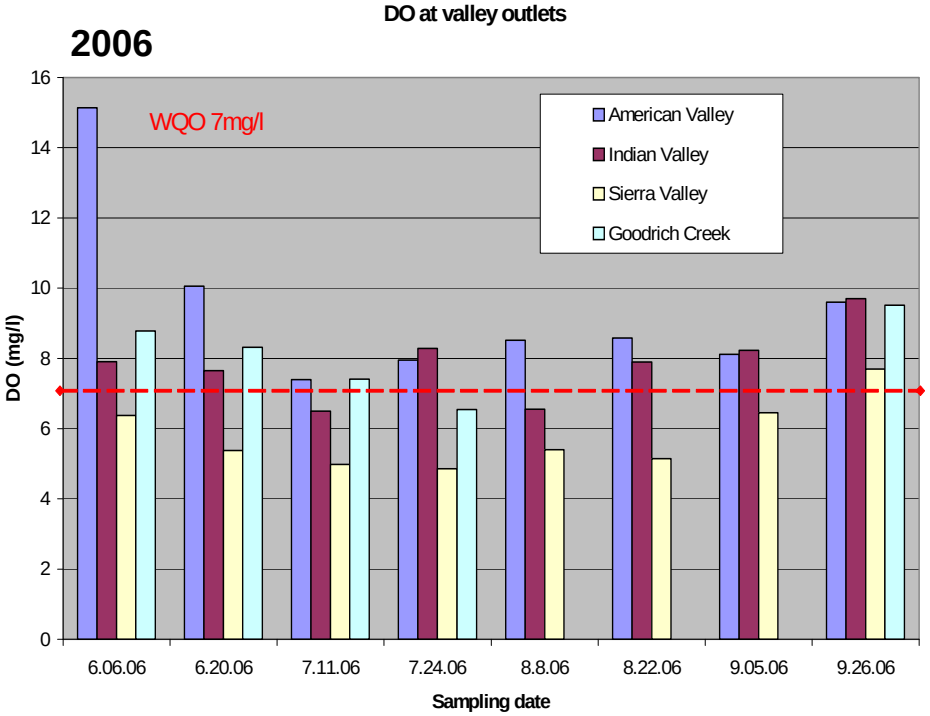


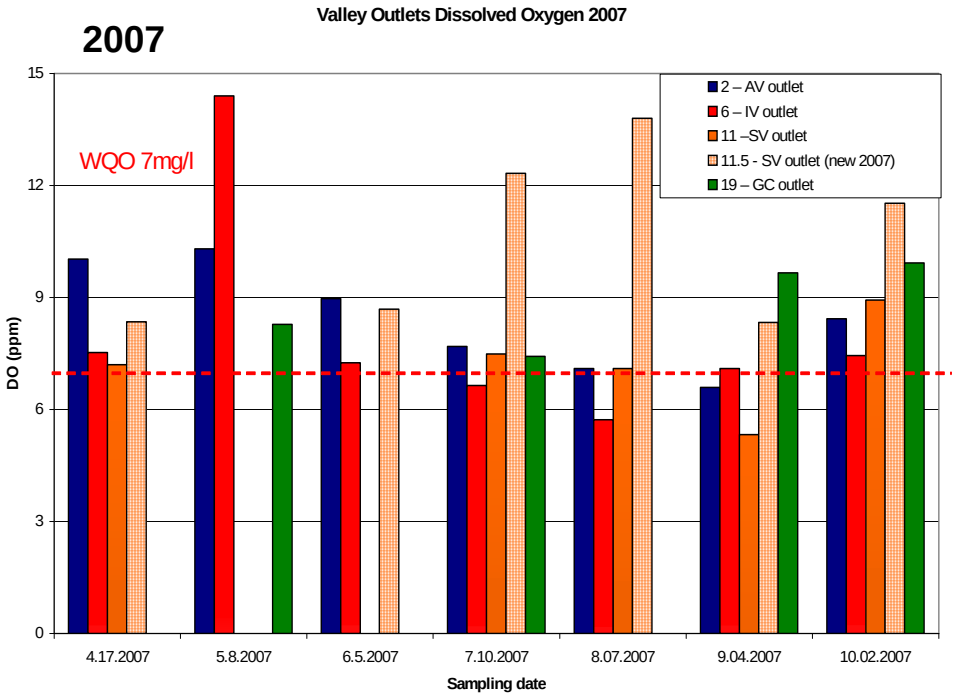
Dissolved Oxygen

- Lower limit "Cold Water" Streams: **7 mg/L**
- All streams monitored are classified as "cold water" streams



Dissolved Oxygen - Outlets





2007: DO in all valleys similar to 2006 values throughout season

SV: 2006-2007 Site 11.5 tends to be higher in DO than site 11

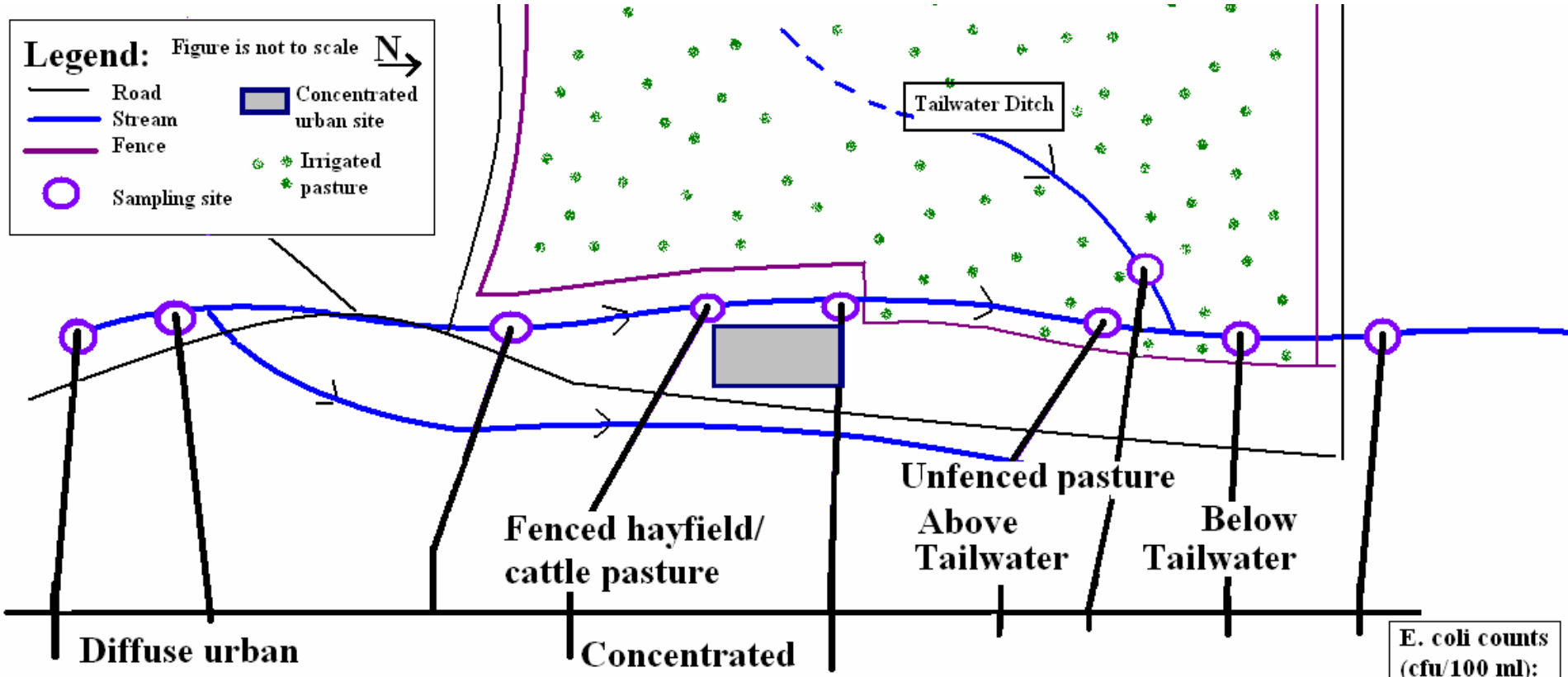
Phase I Summary ➡ Phase II

- *E. coli* is WQ Constituent of concern, more than DO that management can influence
- ⬆ ***E. coli*… when, where, why?**
  - Warm blooded animals, rural residential, recreation, wildlife, pastures & moist sediment

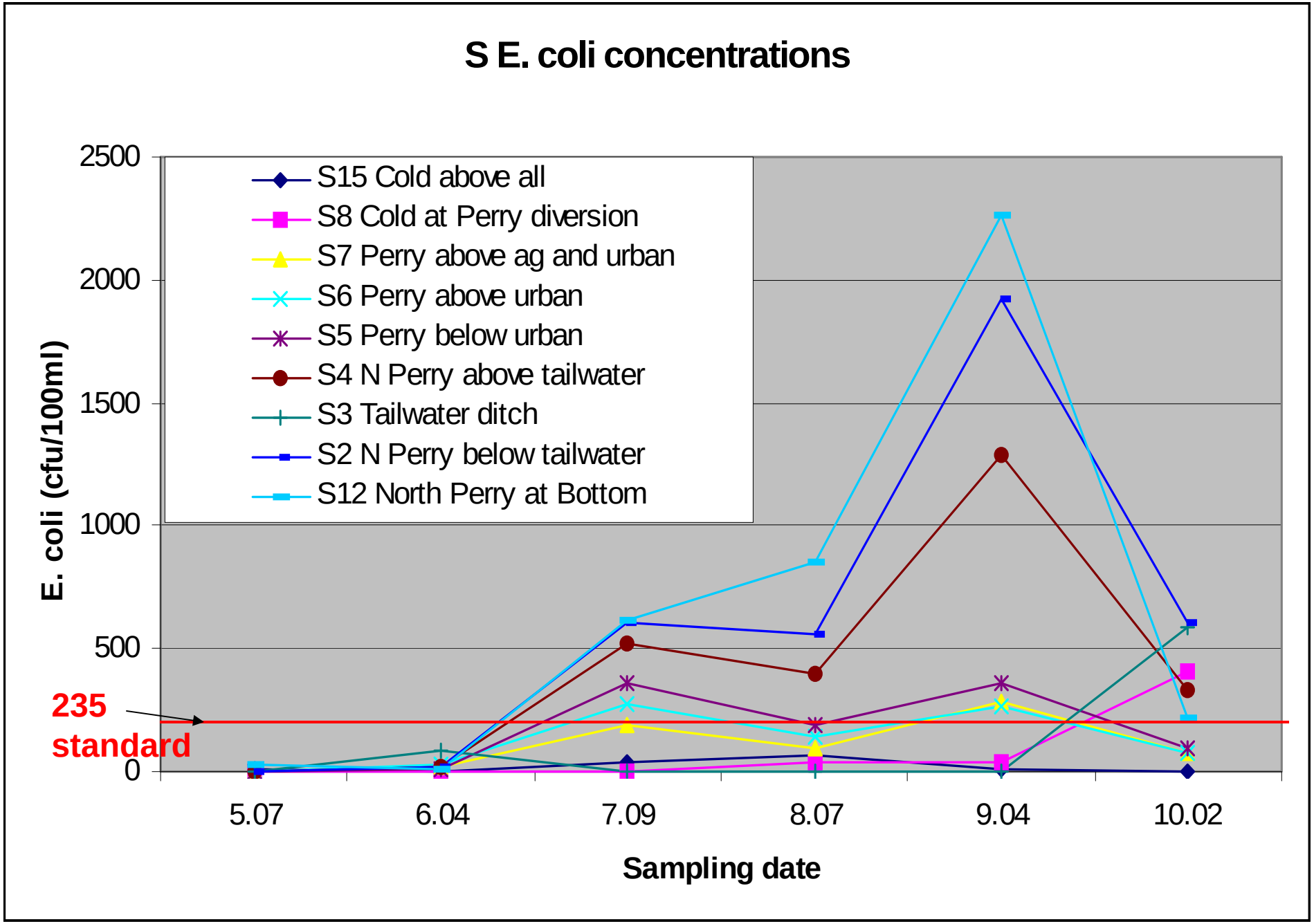
Phase II

- **Understand *E. coli* in the UFRW system**
- **Worked with 10 willing cooperators**
  - Evaluation of management measures: (buffers, off-site water, exclosure fencing, etc.)
- **Number of sites varied per ranch**
- **Record:** flow, stream/ditch depth & width, presence of cattle, actively irrigating, tailwater returning to the system

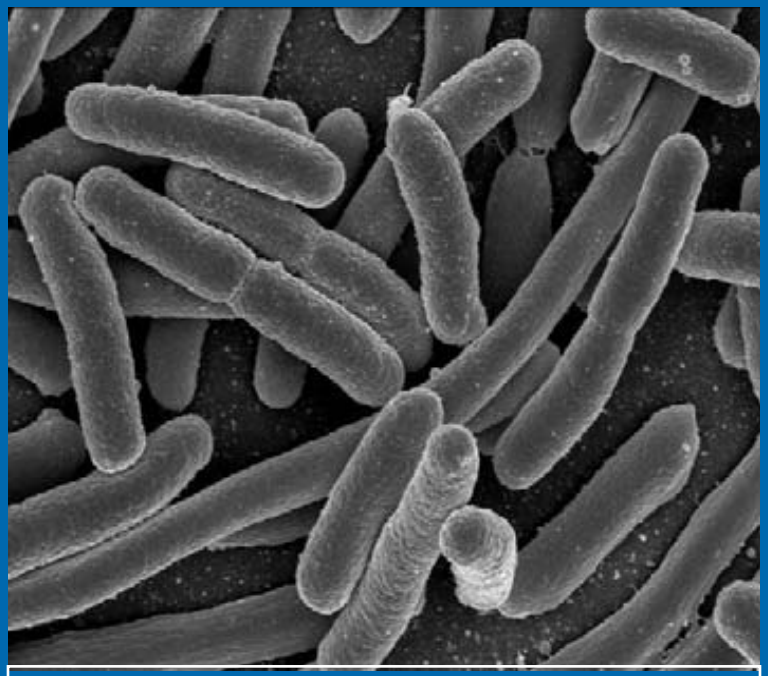
Sierraville Study



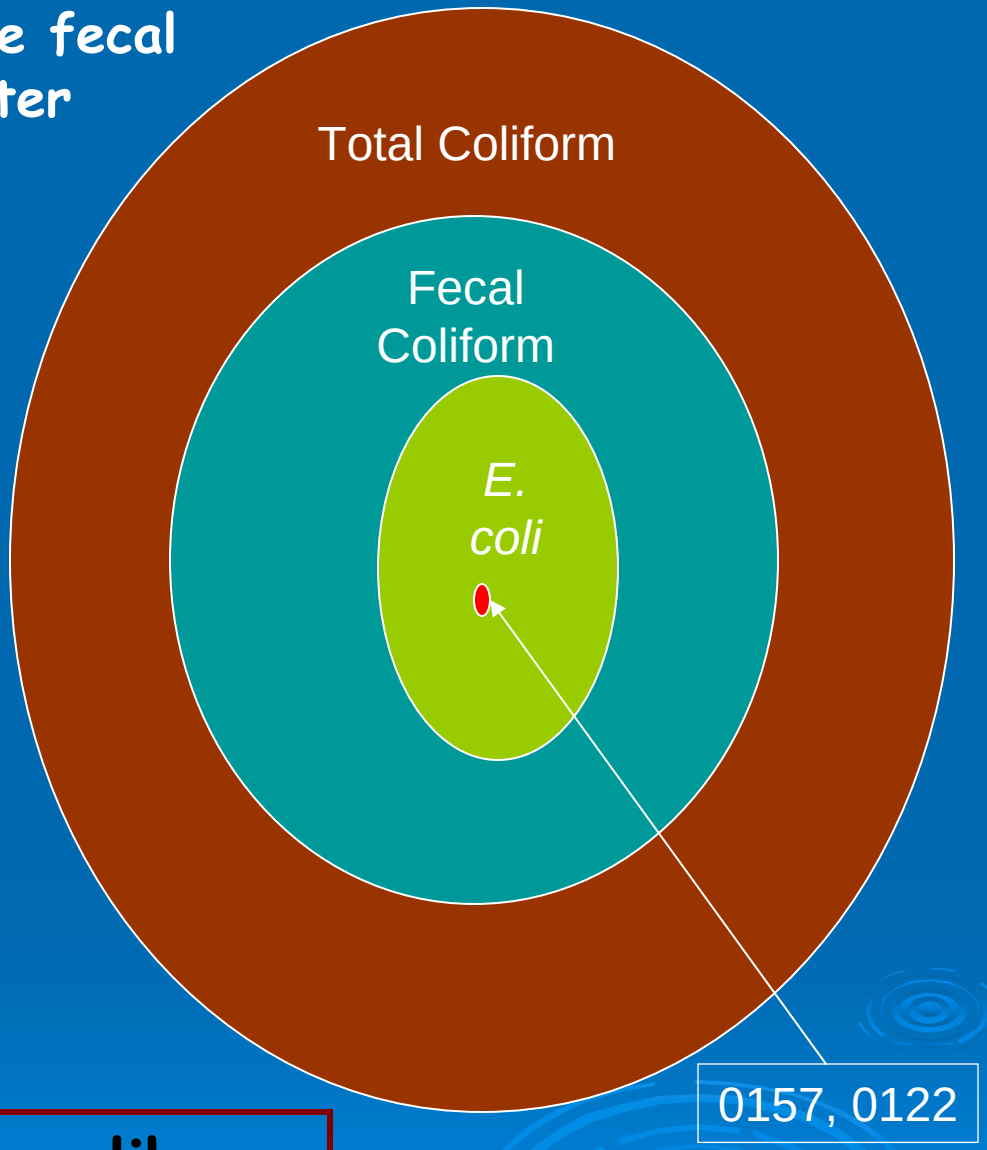
E. coli counts (cfu/100 ml):									
May	6	0	1	1	1	2	4	3	24
June	0	4	23	25	12	18	85	21	12
July	38	na	192	272	358	522	na	608	620
August	64	38	90	146	186	397	na	560	850
Sept.	8	40	286	267	361	1287	na	1920	2267
October	2	411	71	72	99	329	590	603	214


S E. coli concentrations
2500
2000
1500
1000
500
0
E. coli (cfu/100ml)
235
standard
S15 Cold above all
S8 Cold at Perry diversion
S7 Perry above ag and urban
S6 Perry above urban
S5 Perry below urban
S4 N Perry above tailwater
S3 Tailwater ditch
S2 N Perry below tailwater
S12 North Perry at Bottom
5.07
6.04
7.09
8.07
9.04
10.02
Sampling date

E. Coli is an indicator to measure fecal contamination of surface water



Individual *E. coli* bacteria.
Magnified about 15,000 times.



Concern is actual pathogens like:
***Giardia, Salmonella, Crypto, Camphyobacter, E. coli* 0157:H**

What is the relationship of elevated *E.coli* levels to presence of pathogens?

- 1 gallon samples
- *E.coli* cfu/100ml
- Presence (Y/N) of *C. parvum, Salmonella, Campyobacter*
- 3 *C. parvum* (Y)
- Awaiting results pathogenic *E. coli*

5 Sampling Sites (3-Sierra Valley, 2-Goodrich Creek)	
6 Sampling Events (April, May, June, July, August & October)	# Samples 30
Elevated *E coli*	10
Correlated w/ Pathogens	1

Next Steps

- Complete compliance WQ monitoring @ 3 ILRP sites
- Investigate causes of *E. coli*, DO & pH ? More pathogen studies?
- Assist with Management Plans (individuals/group)
- Transition local UFRW Group to ?? after Prop 50 $ ends (3/2009)
- Coordinate future funding to include irrigated agriculture
- Ag shouldn't have to pay for monitoring from community contributions to WQ problems….counties need to help??

Soil Moisture & Forage Quantity and Quality Study

QUESTIONS?
Prop 50 UFRW WEBSITE http://ucanr.org/ufrwwaterquality