3rd Russell L. Rustici Rangeland Science Symposium




Rangeland Watershed Laboratory

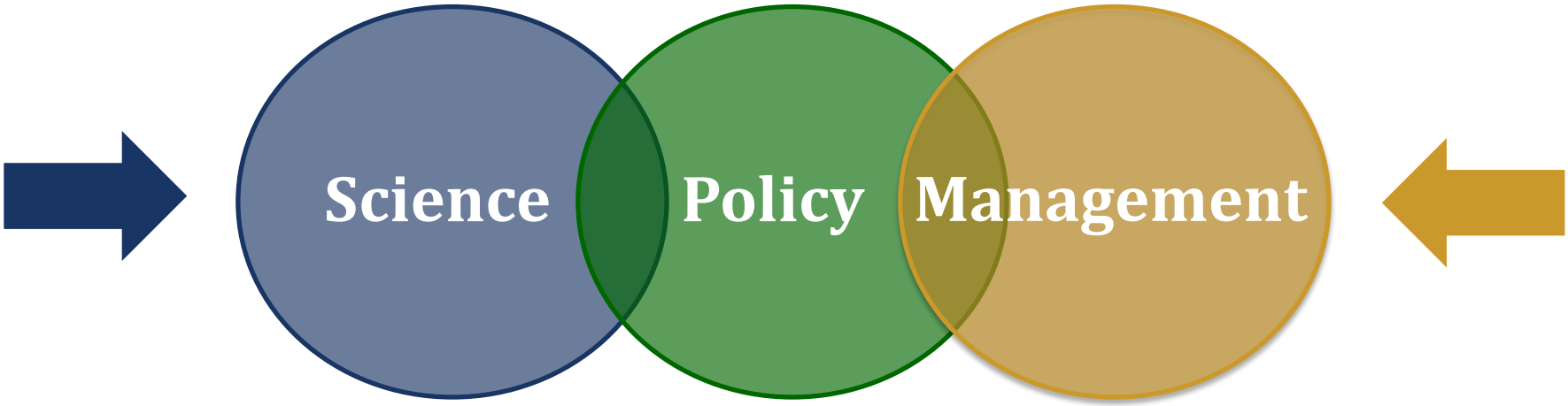
rangelandwatersheds.ucdavis.edu

UC CE

University of California
Agriculture and Natural Resources

Context for this Symposium

Partnerships among scientists, managers, and policy makers provide the best opportunities to protect working rangelands.



Topics this year…

Range & Grazing Land Water Quality

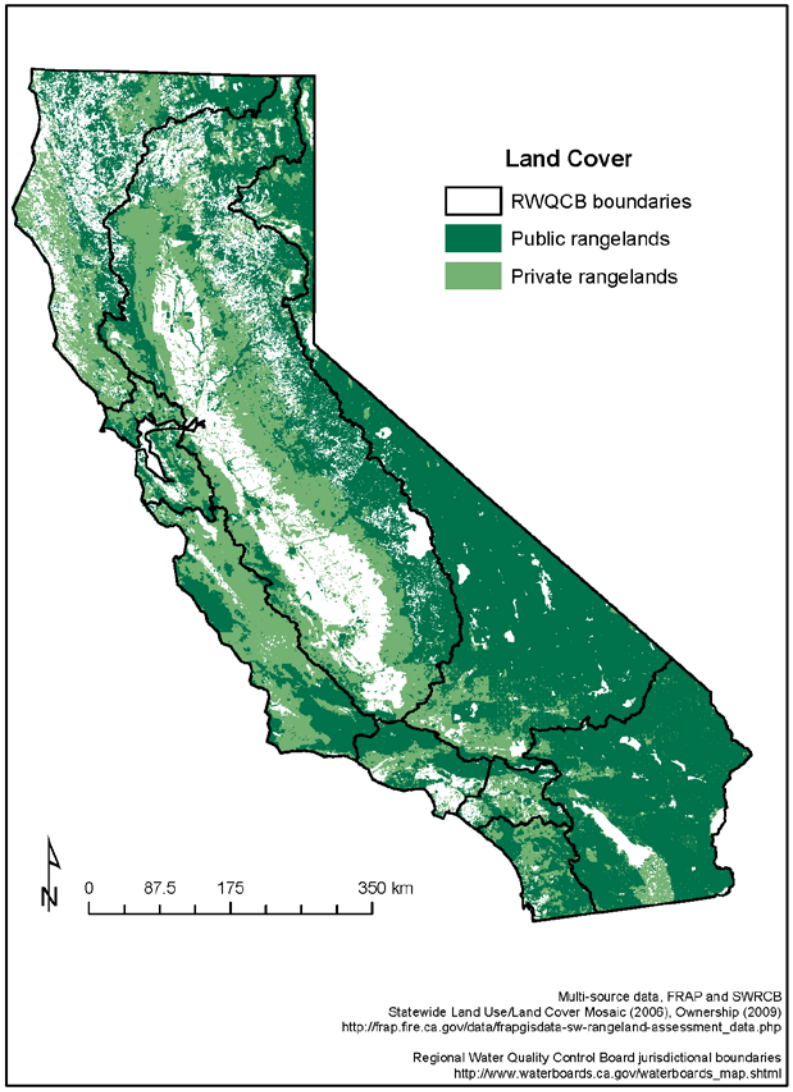
- *25 years of partnership and progress*
- *What comes next?*

Sustainable Public Lands Grazing

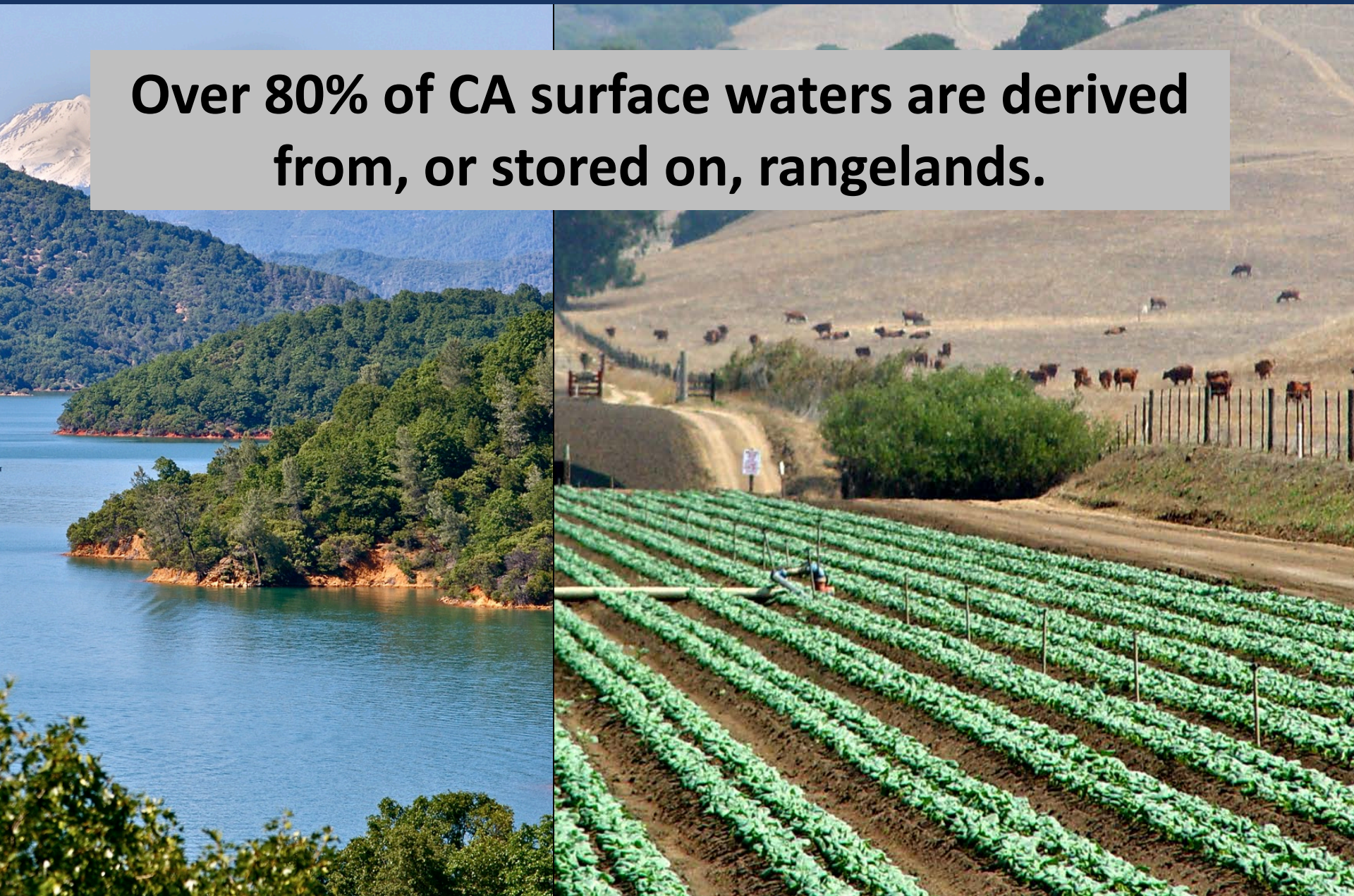
- *Balancing goals and values to define a shared vision*

CA Rangelands

- 57 M acres.
- 22 M acres privately owned.
- 500 active USFS grazing allotments over 8 M acres.
- $3 B annual sheep & cattle industry.
- 1000's of plant and animal species.



Safe Water to Drink and Irrigate



Over 80% of CA surface waters are derived from, or stored on, rangelands.

Water Quality Introduction

California's rangeland WQ partnership.

Where we've been and where we are now.

WQ impairments, grazing, and California.

Status check on grazing land WQ conditions.

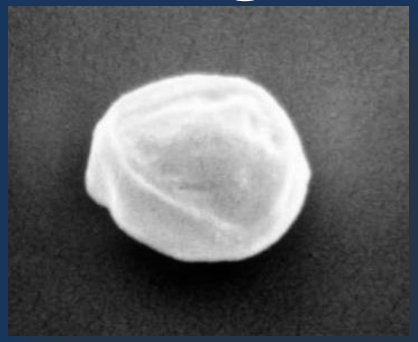
Early 1990's, concerns about…

- Microbial pollutants – *Cryptosporidium, E. coli*
- Nutrients – nitrogen and phosphorus
- Sediment – erosion
- Stream Temperature – heating

Bay Area – *Cryptosporidium*

Livestock

Pathogens



C. parvum

Drinking Water

Contra Costa Ti

No. 227 Monday, January 6, 1997

Tiny parasite has water districts, cattle ranch

By DENIS CUFF
Staff writer

Cattle and water. They go together on many California landscapes where cows roam valleys above deep blue reservoirs.

A nasty bug has intruded on the pastoral scene: a parasite in animal droppings that can sicken people, even kill them when it gets into water sources.

Now some drinking water suppliers are questioning whether it's safe to mix cattle and reservoir lands.

The bug is cryptosporidium, a tough, tiny parasite that hits most people like the flu, but can kill AIDS patients or others with compromised immune systems.

Cryptosporidium has captured the attention of the water industry in the past three years because of some unusual features.

NORBERT VON DER GROEBEN/Times

JOHN GARRETT JACKSON, 15, herds cattle recently from one of his father's fields to another on the family's leased ranch property off Vasco Road.

Parasite

FROM PAGE 1A

cord. "I think we are just beginning to understand that cryptosporidium is going to be a major water concern for the quality of drinking water in California."

The Contra Costa Water District this month recommended phasing out grazing in the buffer lands around its Los Vaqueros Reservoir under construction south of Brentwood. The reservoir will store drinking water for 400,000 people.

The neighboring East Bay Municipal Utility District is looking into tighter grazing restrictions on its land

Scientists seek watery solution to halt 'mystery spore' outbreak

By DENIS CUFF
Staff writer

You might call it the mystery bug. Scientists did, giving this parasite the name cryptosporidium that translates as "mystery spore."

The parasite repeatedly stumped scientists, who didn't discover until 1976 that the microscopic organism could harm people.

It took until the early 1980s to document the first case of the parasite moving through drinking water to infect a human and cause

tection Agency and the Centers for Disease Control.

Under a new information collection rule, the EPA is requiring large water suppliers next month to begin monitoring for cryptosporidium.

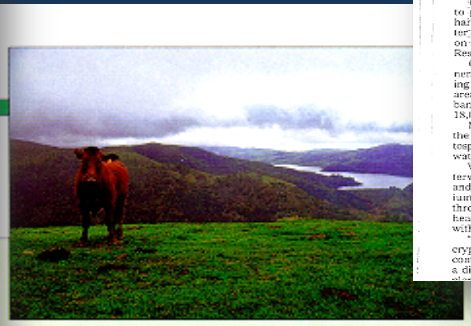
California has reported no water-transmitted outbreaks of the parasite. Water managers, however, have reported outbreaks in other states where the suppliers met federal regulations for water treatment.

The worst of America's six known outbreaks was in Milwaukee in 1993, where 400,000

Parasite risks i

Cryptosporidium [crip toe spore mammals, especially calves. Co banning cattle — or maybe just the Los Vaqueros watershed 7 of contracting cryptosporidiosis but the district doesn't want to t

A protective shell called



A4 c THE TIMES • MONDAY, MARCH 24, 1997

LOCAL

Water district backs away from cattle grazing ban around lake

By DENIS CUFF
TIMES STAFF WRITER

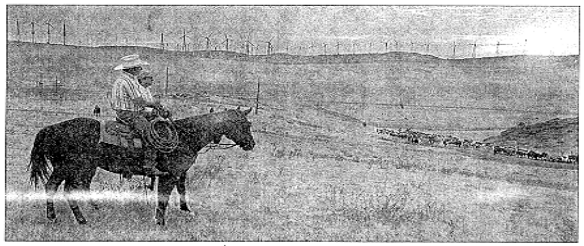
Backing off a proposed cattle ban to protect drinking water from a harmful parasite, a Contra Costa water supplier may allow some grazing on lands around the Los Vaqueros Reservoir.

Contra Costa Water District planners say it's enough to control grazing by selectively banning it in some areas, fencing off the reservoir, and banning young calves on most of the 18,000 acres around the reservoir.

Manure from young calves has the highest risk for spreading cryptosporidium, a bug that has made the water industry wary.

Widely found in America's waterways and in feces of many wild and domestic animals, cryptosporidium can resist chlorine and slip through many water filters to make healthy people sick and kill those with weak immune systems.

"Calves are the major shedders of crypto. By eliminating them, we can control the risk," said John Steere, a district watershed planner. "This



JOE PAULO, foreground, and Russell Jackson keep an eye on their cattle from horseback on Walker Ranch, where Jackson leases land for his herd to graze.

RECOMMENDATIONS

trict would install fencing to keep

n Francisco water district targets cattle

In February, the San Francisco Public Utilities Commission (PUC) seemed poised to ban cattle

ness (cryptosporidiosis) lasts only a few days i most people with healthy immune systems, bu

Tim Koopmann

- Coho salmon was ESA listed
- Sediment and stream temperature
- TMDL consent decree for 20+ north coast water bodies

Sacramento Bee Exclusive, 2010

USFS Grazing Allotments

"Nowhere is the water dirtier…"

"Livestock waste found to foul Sierra waters"

"…incredible weapon of mass destruction"

Leslie Roche

Rangeland Watershed Program

A 25 yr proactive partnership to improve water, range, and ranch enterprises. (Agencies, Ranchers, UC, NGOs).

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A 25 yr proactive partnership to improve water, range, and ranch enterprises. (Agencies, Ranchers, UC, NGOs).

Started in the early 1990's to address these emerging issues…..

Rangeland Watershed Program

A 25 yr proactive partnership to improve water, range, and ranch enterprises. (Agencies, Ranchers, UC, NGOs).

Basic Research

How do these watersheds function?

Extension

Management, policy, regulation.

Applied Research

How does management effect function?

Rangeland Watershed Program

- Integrate science, policy, and management.

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- Effective policies and strategies to safeguard water quality.

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- Ranch specific WQ management plans.

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- Education to identify and manage WQ risks.
- Ranch specific WQ management plans.
- Supporting research base.

25 years of progress

1990

2015

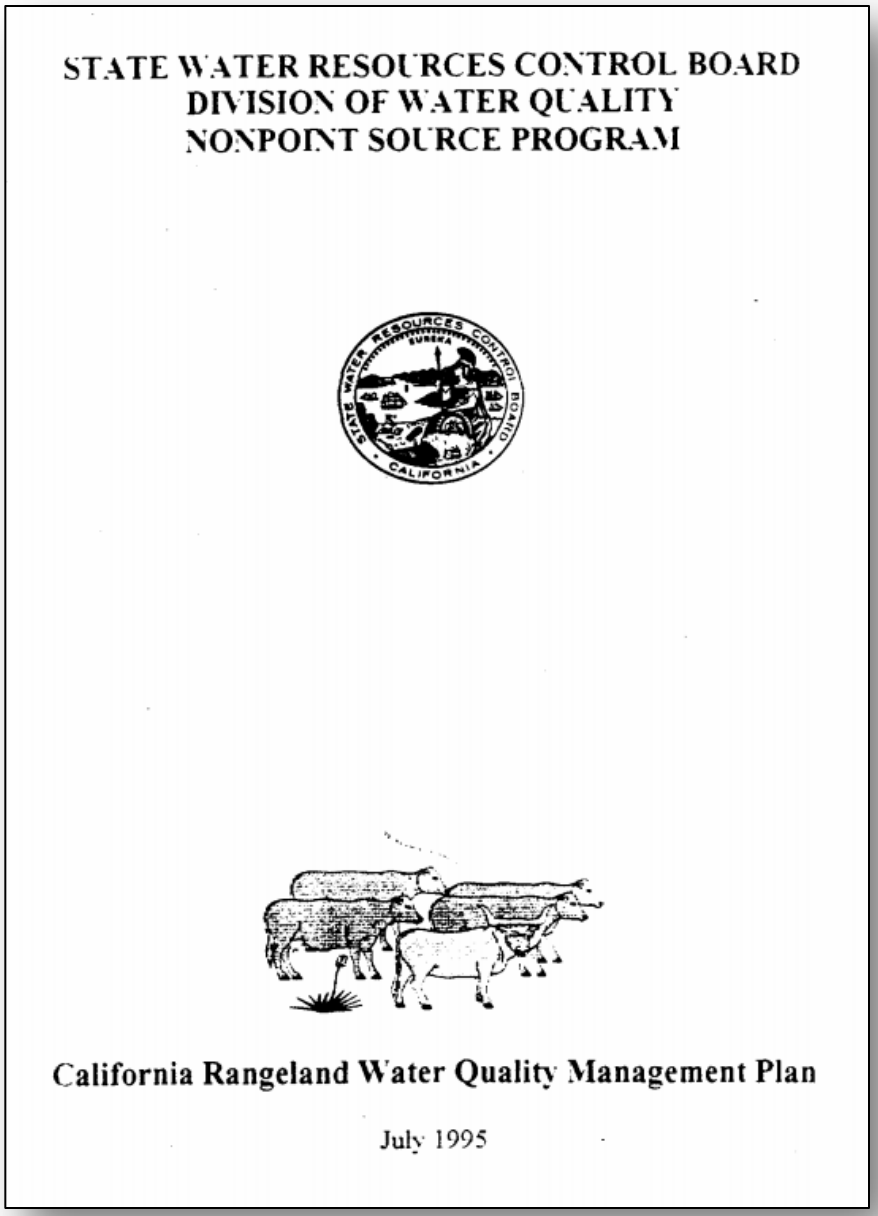
25 years of progress

CA Rangeland WQ Management Plan – complete 1995

1990

2015

CA Rangeland WQ Management Plan


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

California Rangeland Water Quality Management Plan

July 1995

1. Outlines science-based management strategies to prevent water quality impairments.

2. Provides for educational programs to develop on-ranch water quality protection strategies.

http://www.waterboards.ca.gov/publications_forms/publications/general/docs/ca_rangeland_wqmgmt_plan_july1995.pdf

Crafted in partnership

California Rangeland Water Quality Management Plan

Technical & Policy Advisory Committee

Organization	Name	Title
CA. Cattlemen's Association	Mike Bennett	Water Quality Chair
CA. Cattlemen's Association	George Gough	Director, Gov. Affairs
CA. Cattlemen's Association	Marden Wilber Jr.	Rancher
CA. Cattlemen's Association	Mark Moore	Rancher
CA. Cattlemen's Association	Russell Rustici	Rancher
CA. Coastal Conservancy	Laurel Marcus	Project Manager
CA. Department of Conservation	Chuck Tyson	Soil Resource Specialist
CA. Department of Fish & Game	Mark Horshovsky	Natural Heritage Program
CA. Department of Fish & Game	Barry Garrison	Wildlife Management
CA. Department of Fish & Game	Jim Steele	Environmental Services
CA. Department of Fish & Game	Jane Vorpagel	Environmental Specialist
CA. Department of Forestry	Tom Randolph	Rangeland Programs
CA. Department of Forestry	Clay Brandow	Watershed Specialist
CA. Department of Forestry	John Munn	Soil Scientist
CA. Farm Bureau Federation	Clancy Dutra	RMAC Representative
CA. Farm Bureau Federation	Bruce Blodgett	Natural Resources
CA. Native Plant Society	Emily Roberson	Public Lands Planner
CA. Oak Foundation	Ginger Strong	Executive Committee
County Supervisors Association	Mary K. Shell	Chair, Ag. & Nat.Resource
County Supervisors Association	Tom Bamert	V.Ch., Ag. & Nat.Resource
CA. Watershed Management Council	Donna Lindquist	PG&E
CA.Woolgrowers Association	Steve Hackett	Rancher
CA.Woolgrowers Association	Jay Wilson	Executive Vice President
CalTrout Inc.	Tom Hesseldenz	Executive Director
CA Resource Conservation Districts	Chuck Pritchard	RMAC
Marin Agricultural Land Trust	Lisa Bush	Monitoring Specialist

Natural Resources Defense Council	Dr. Tom Dudley	Pacific Institute
Nature Conservancy	Rich Reiner	Range Scientist
Range Management Advisory Comm.	Barbara Allen-Diaz	U. C. Berkeley
Rangeland Consultant	Jim Clawson	Technical Writing
RWQCB - Central Coast	Howard Kolb	Water Resources Engineer
RWQCB - Central Valley	Dennis Heiman	Environmental Specialist
RWQCB - Central Valley	Larry Glandon	Soil Scientist
RWQCB - Lahontan	Fred Blatt	Environmental Specialist
RWQCB - North Coast	Mark Neely	Engineering Geologist
RWQCB - San Diego	Greig Peters	Environmental Specialist
Sierra Club	Dave Fullerton	Water Chair
Society for Range Management	Cathy Bleir	President
Soil & Water Conservation Society	Bea McCamy	President
State Water Resources Control Board	Jack Hodges	NPS Chief
State Water Resources Control Board	Gaylon Lee	NPS Forest Programs
U.C. Cooperative Extension	Mel George	Range Specialist
U.C. Cooperative Extension	Neil McDougald	Watershed Specialist
U.C. Cooperative Extension	Stephanie Larson	Livestock Advisor
U.C.D. Agricultural Issues Center	Dr. Eric Bradford	Animal Science
US Army Corps of Engineers	c/o Calvin Fong	Chief, Regulatory Branch
US Environmental Protection Agency	Jovita Pajarillo	NPS Coordinator
US Environmental Protection Agency	Sam Zieglar	NPS Projects, California
US Environmental Protection Agency	Tim Hatton	SCS/EPA Liasion
US Fish & Wildlife Service	Tom Mauer	Contaminants Division
USDA Consolidated Farm Services	Larry Plumb	State Cons. Specialist
USDA Forest Service	Ralph Giffen	State Range Cons.
USDA Forest Service	John Rector	Watershed Planning
USDA Natural Resource Service	Richard King	District Conservationist
USDA Natural Resource Service	Dennis Nay	Range Conservationist
USDA Natural Resource Service	Gary Bullard	Water Quality Coordinator
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USDA Natural Resource Service	Leonard Jolley	State Range Cons.
USDI Bureau of Land Management	Jim Morrison	State Range Cons.
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25 years of progress

CA Rangeland WQ Management Plan – complete 1995

Rangeland WQ Research – 1994 to present

1990

2015

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Rob Atwill, Randy Dahlgren, & Leslie Roche

1990

2015

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Rangeland WQ Research – 1994 to present

Ranch WQ Planning Short Courses – 1994 to present

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Ranch WQ Planning Short Courses – 1994 to present

Morgan Doran

1990

2015

Ranch Water Quality Planning Short Course

- SWRCB funded curriculum development.

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- Ranch Water Quality Plan – tailored to ranch, watershed, and regulatory vehicle.
- Curriculum updates and adaptations as needed.

Joint Learning and Continuing Ed

Workshops, short courses, field tours to build capacity among extension educators, technical advisors, water board staff, consultants, and others to aid ranchers in developing effective WQ plans.

On-ranch sediment source inventory methods development and training – UCCE, NRCS, & NCRWQCB.

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On-ranch WQ Management Practice Implementation

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On-ranch WQ Management Practice Implementation

Nancy Scolari & Anne Coates

1990

2015

USDA – Practice Cost Share (2009-2014)

- $302 M in rangeland WQ practice implementation
- 7,385 contracts with landowners
- 5.7 M acres contracted

2015 Rangeland Watershed Program

Current, active, and well seasoned with 25 years of experience and co-development.

Basic Research

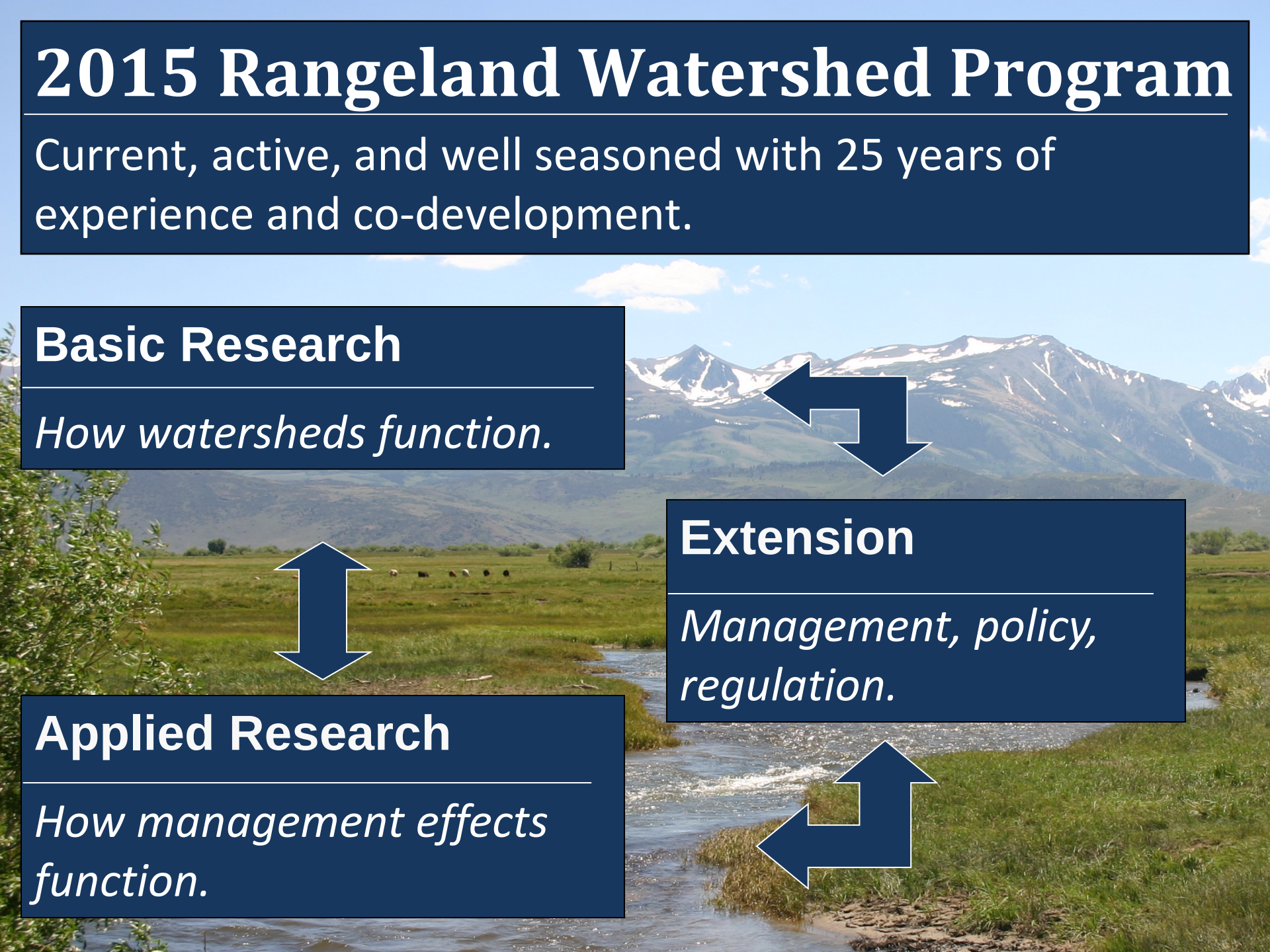
How watersheds function.

Extension

Management, policy, regulation.

Applied Research

How management effects function.



2015: Grazing Regulatory Action Project

"Develop strategies that Regional Water Boards can implement to … protect beneficial uses of surface and groundwater, and address water quality impacts related to livestock grazing in California."

Proposed Schedule for GRAP Development	Estimated Date
•Focused Listening Sessions & Other Stakeholder Outreach	2014
•Development of Initial Proposal •CEQA Scoping and Broader Stakeholder Outreach •Public Comment on Proposal	2015
•Final Drafts of Proposal and Environmental Document •Consideration of Adoption by the State Water Board •Begin Implementation	2016

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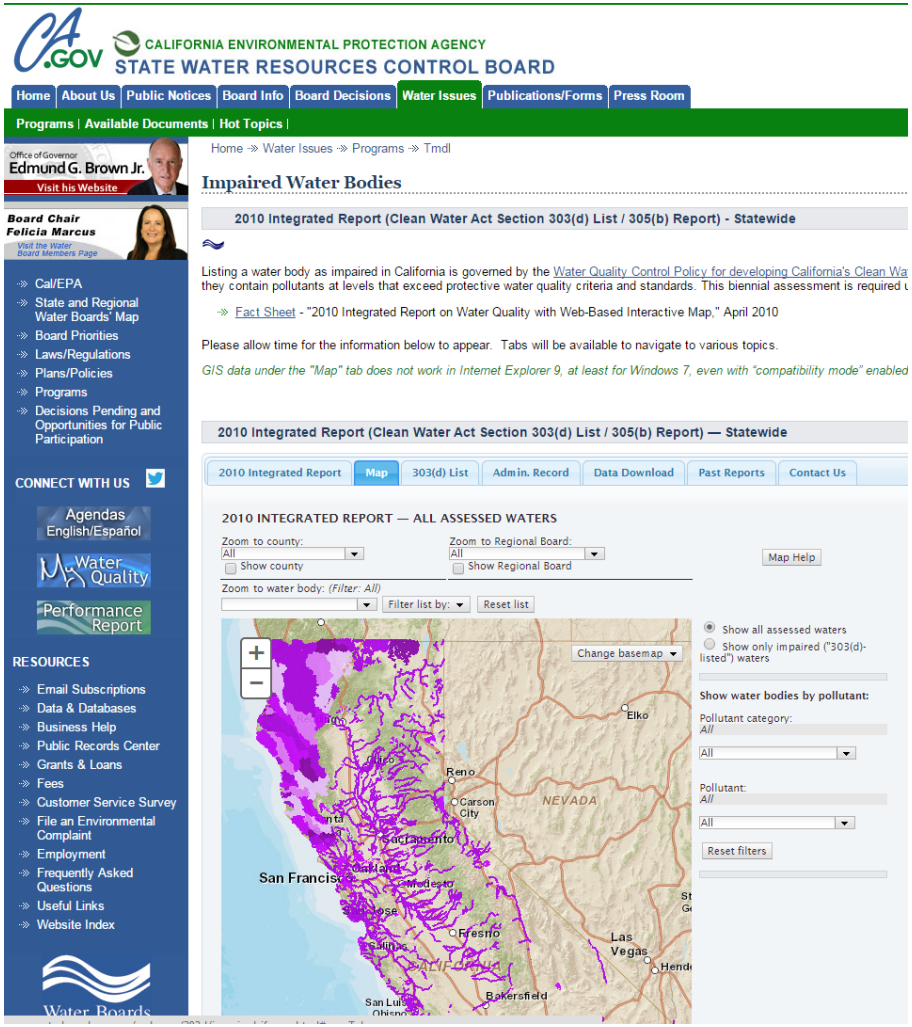
Patty Kouyoumdjian

Water quality impairments in CA?



2010 303d Impaired Water Bodies

GRAP Listening Sessions

- Water quality impairments related to grazing the primary rationale stated for considering a new statewide regulatory program.
- Stakeholders were directed to 2010 303d impaired water body list for supporting information.
- http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml

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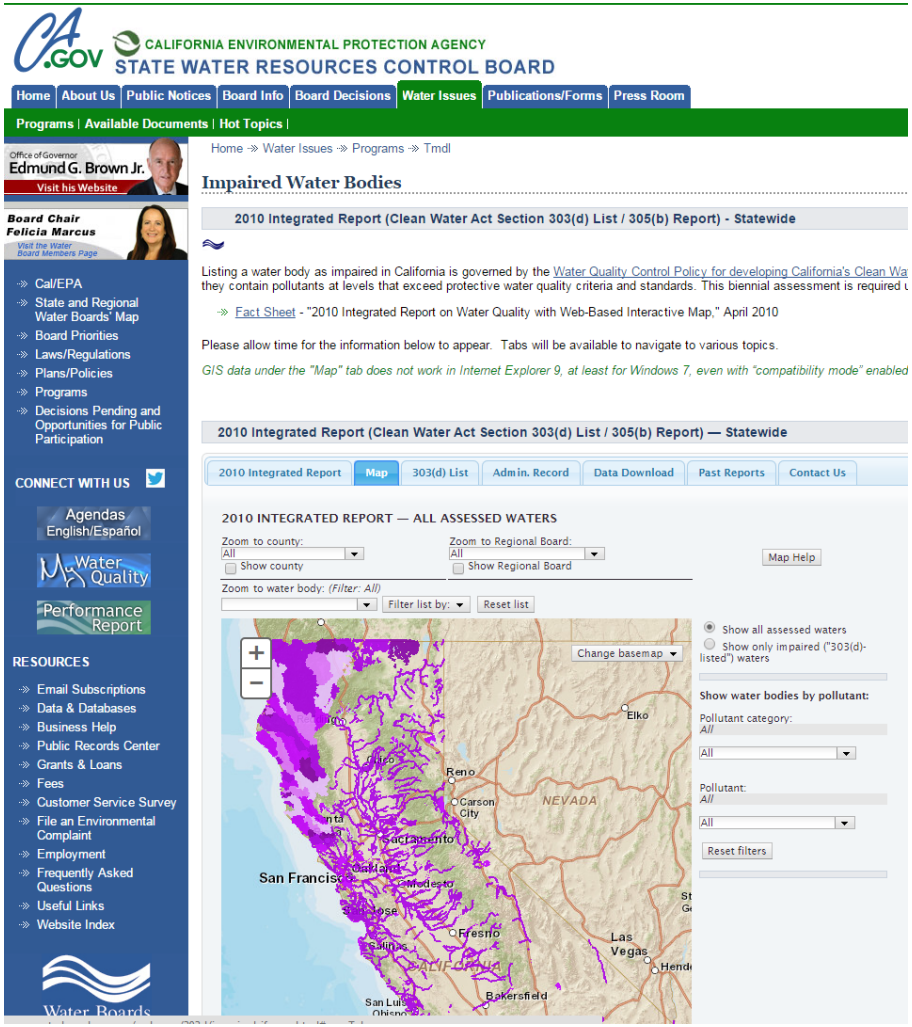
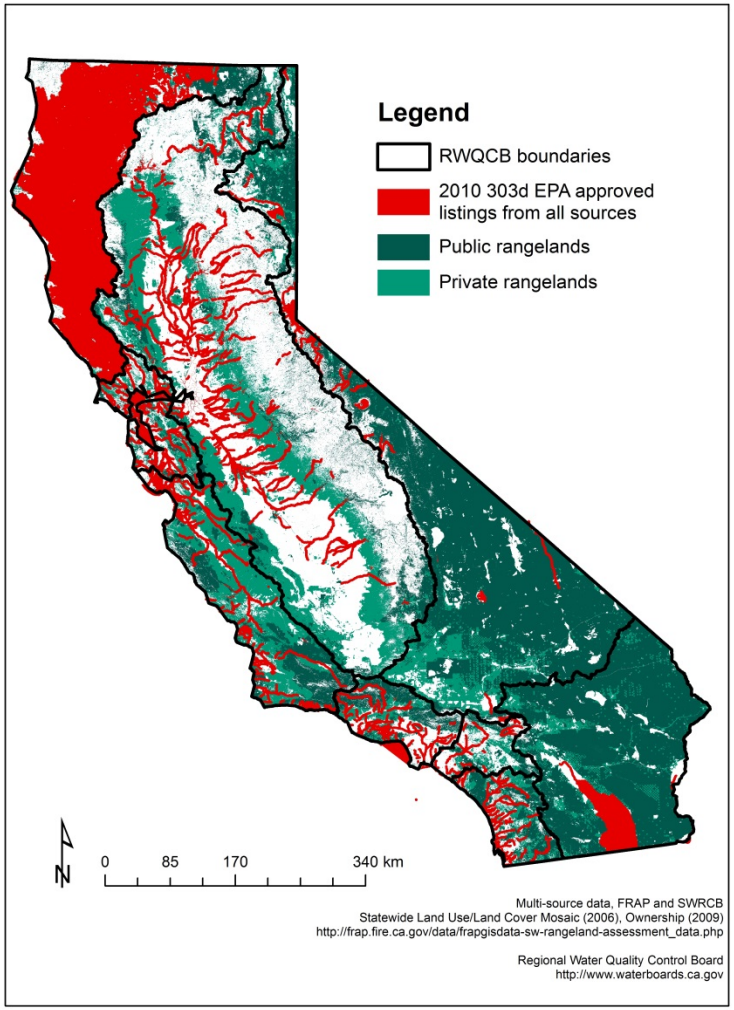


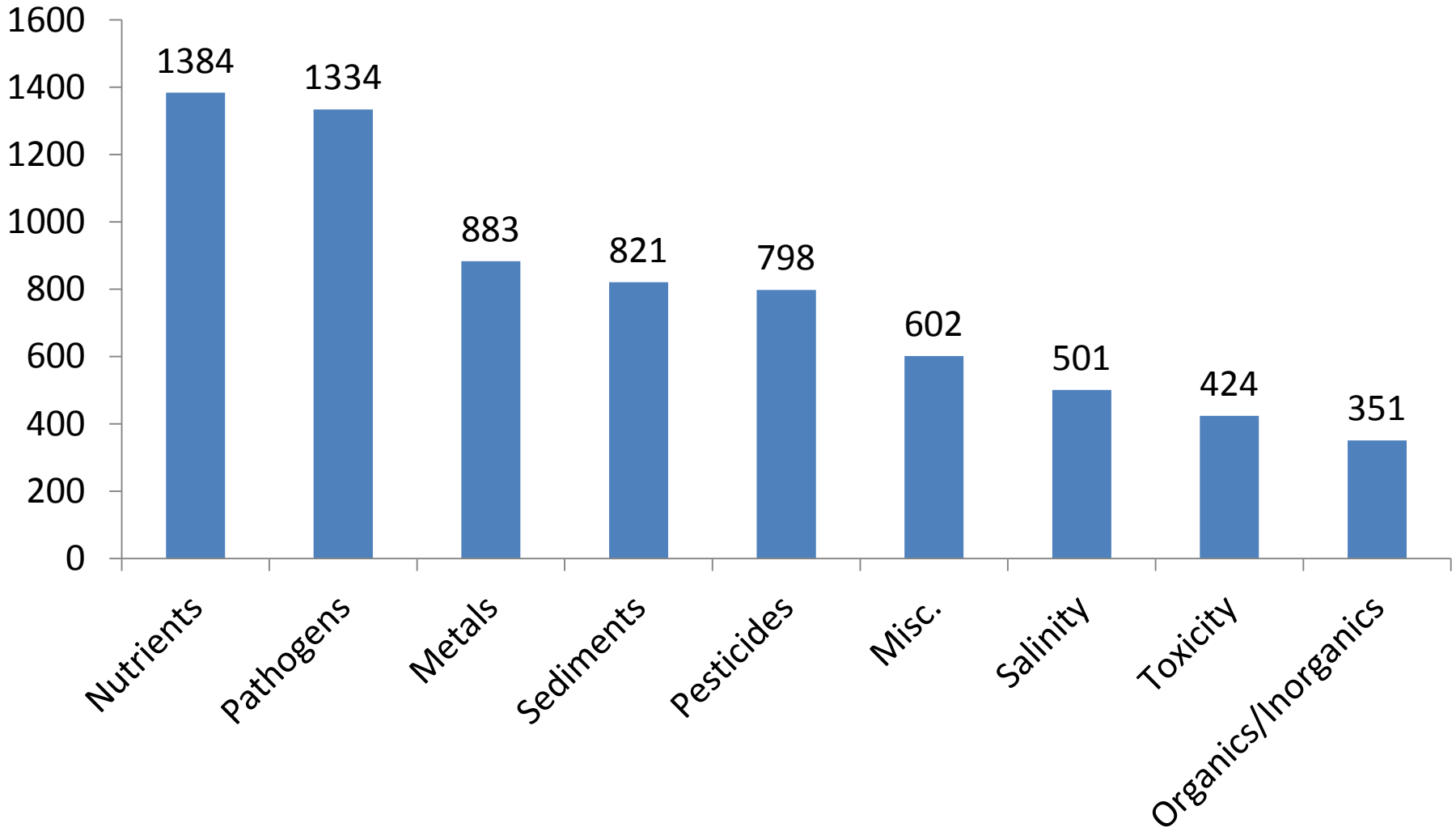
2010 303d Impaired Water Bodies

All WQ Impairments (n=7,294)



Leslie Roche and D.J. Eastburn. 2015

Primary Pollutants



2010 303d Impaired Water Bodies

Grazing as a *potential* source of impairment?

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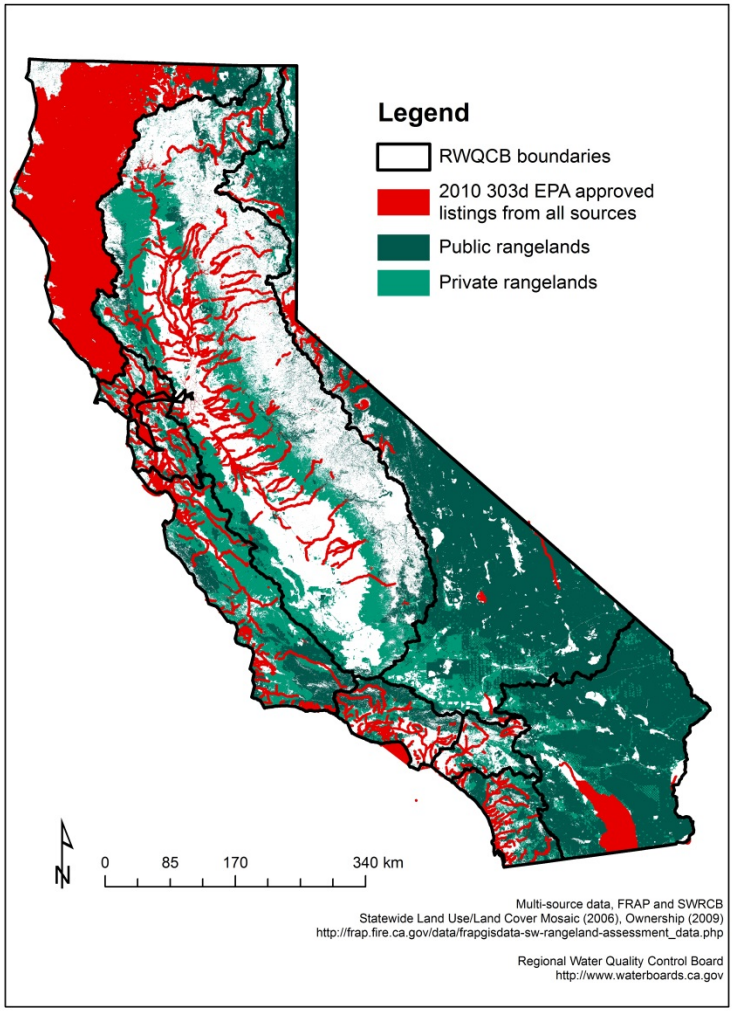
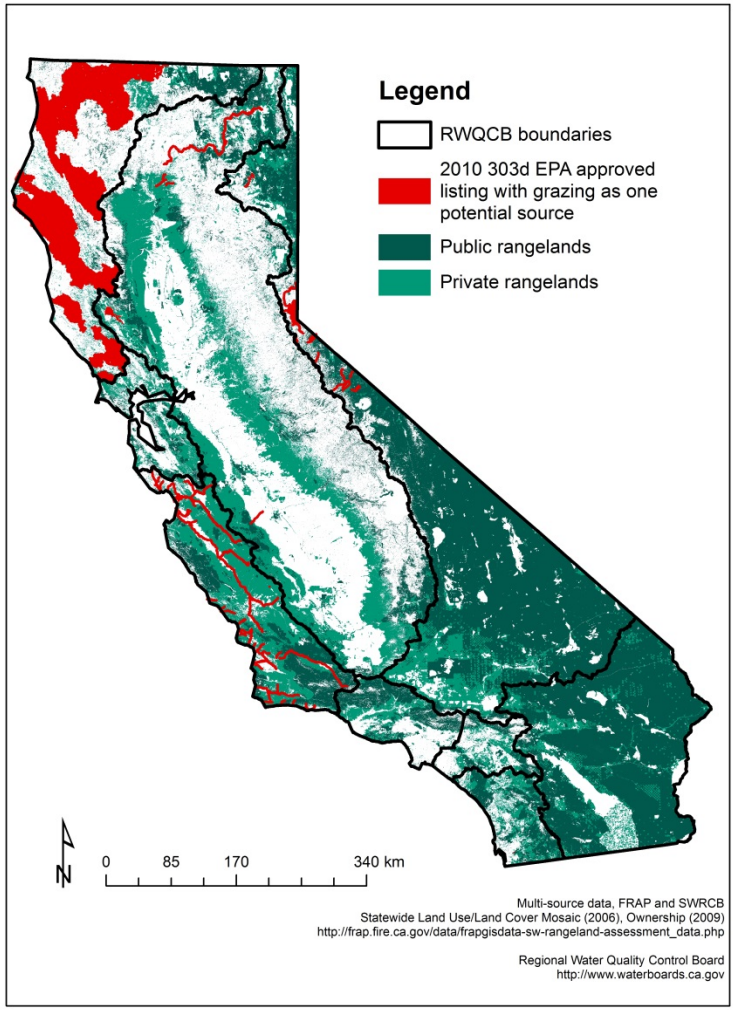


2010 303d Impaired Water Bodies

Leslie Roche and D.J. Eastburn. 2015

Grazing as a *potential* source of impairment? 4% of all listings

Grazing a *Potential* Source (n=324)



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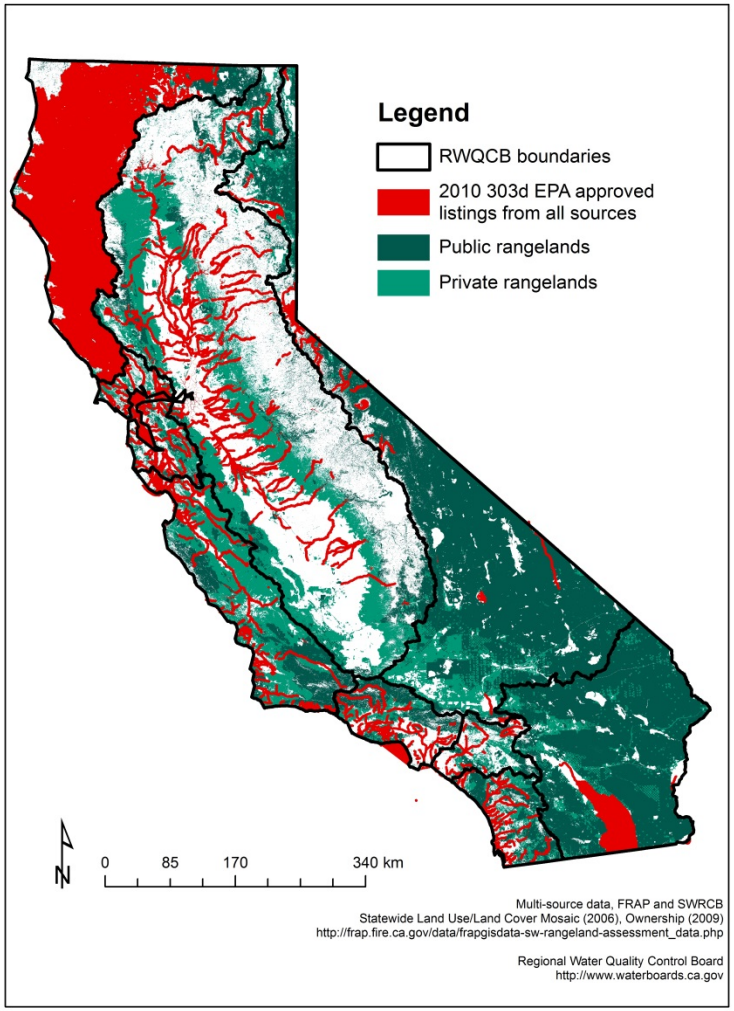

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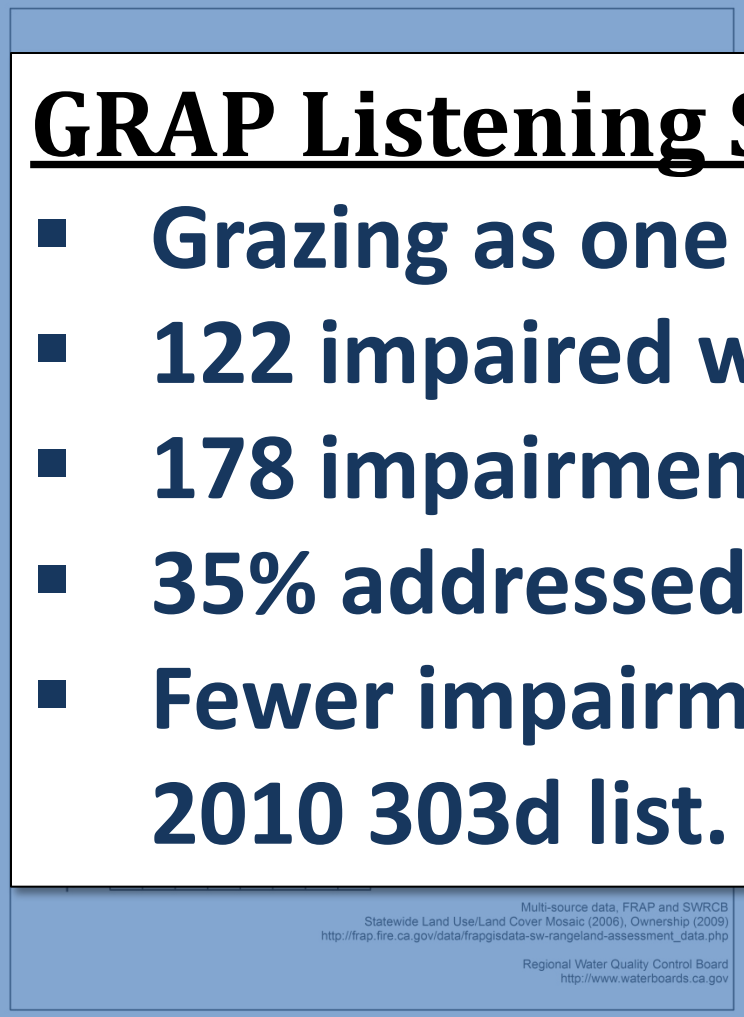

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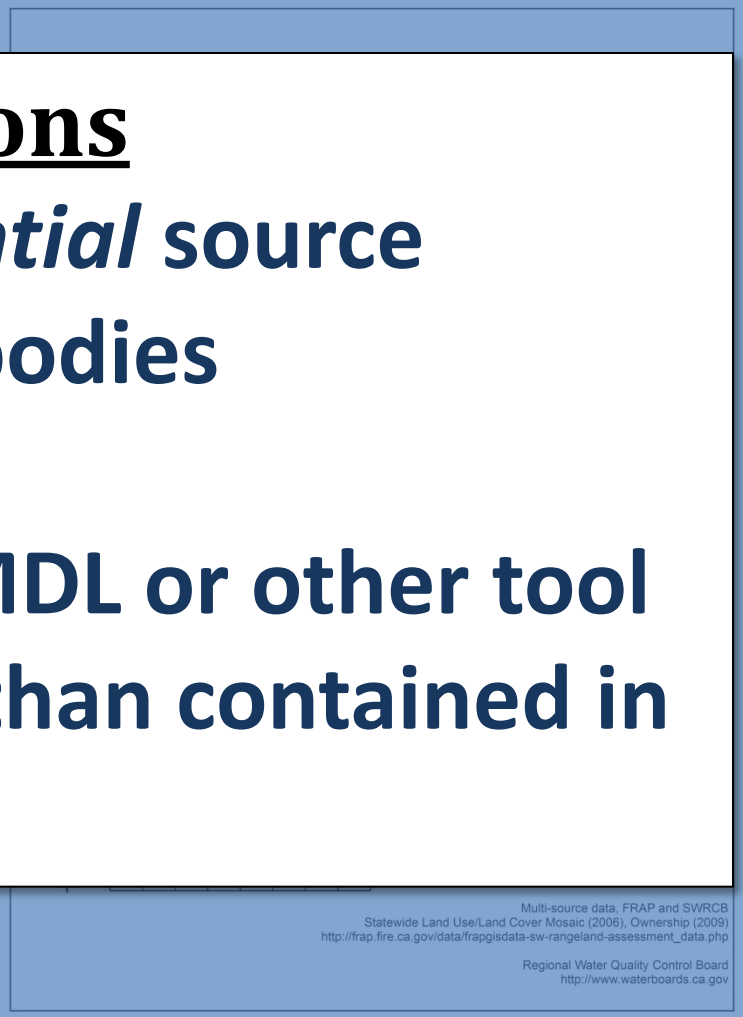


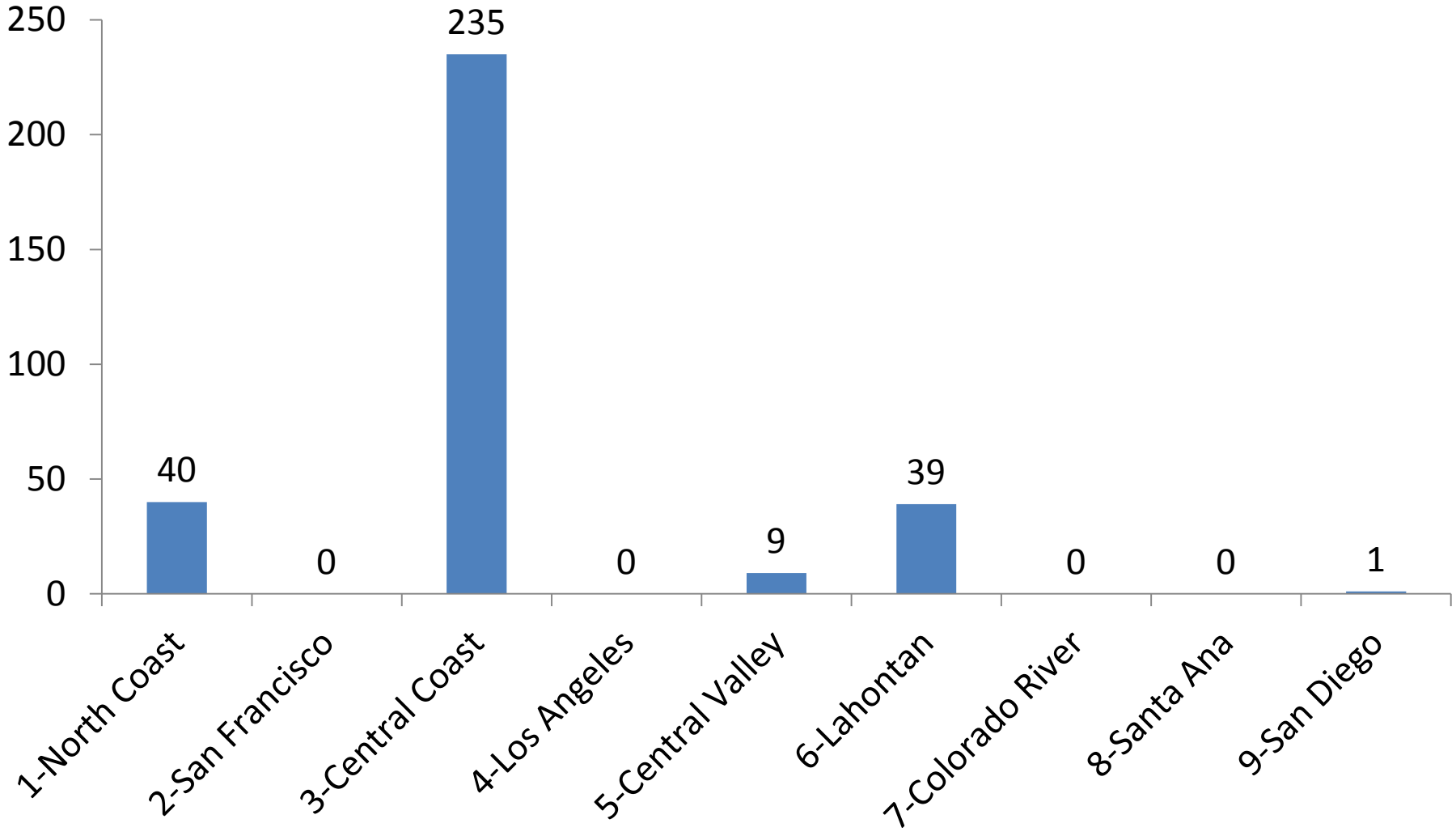
GRAP Listening Sessions

- Grazing as one *potential* source
- 122 impaired waterbodies
- 178 impairments
- 35% addressed w TMDL or other tool
- Fewer impairments than contained in 2010 303d list.

2010 303d Impaired Water Bodies

Leslie Roche and D.J. Eastburn. 2015

Distribution of *potential* grazing impairments?



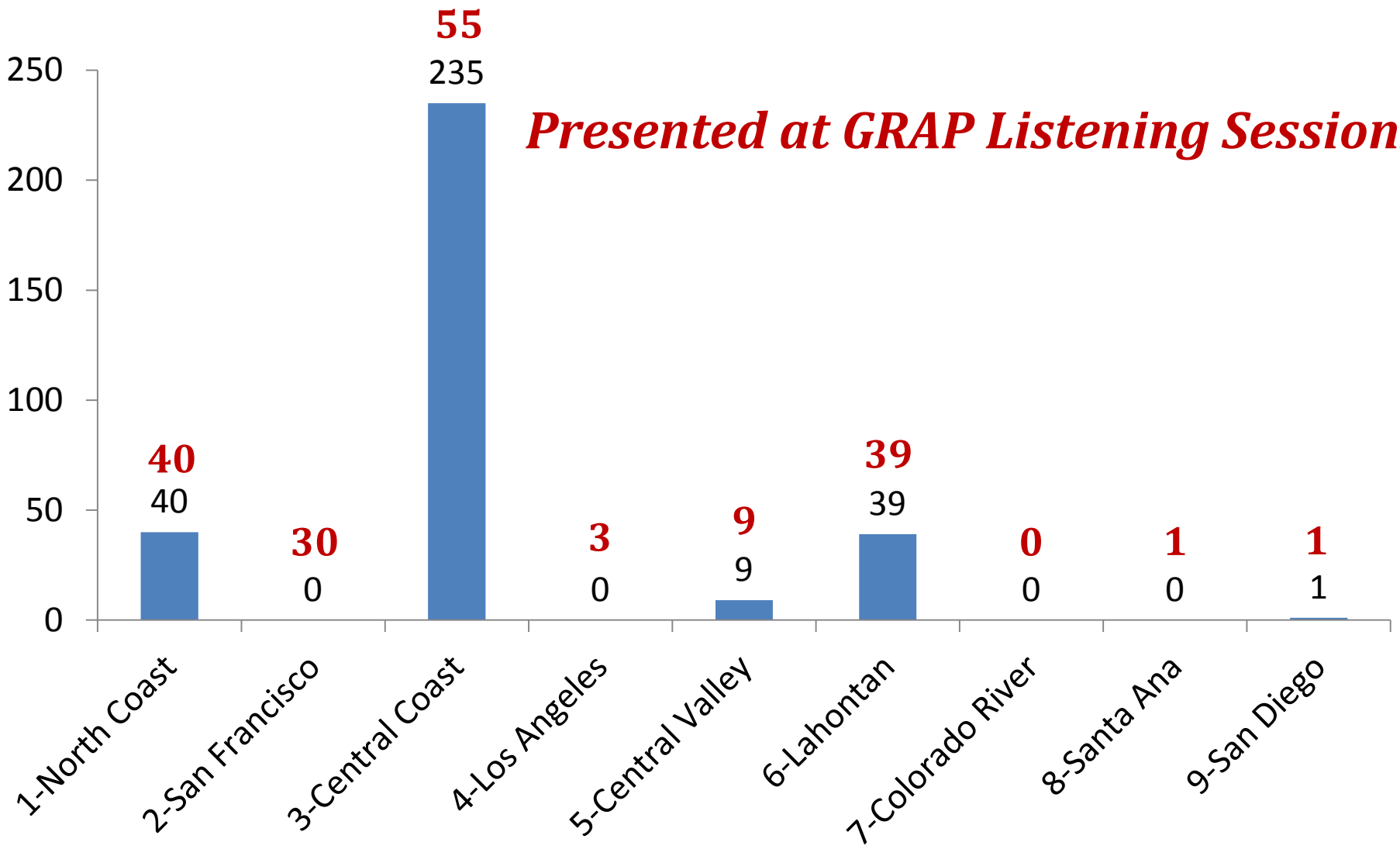
2010 303d Impaired Water Bodies

Grazing as a *potential* source of impairment?

- **26% (85 of 324) of *potential* grazing impairments are pollutants not likely associated with grazing.**
- **All of these are in Central Coast RWQCB.**

Pollutant	% Listings (No. Listings)
Salinity	12% (39)
pH	4% (14)
Unknown toxicity	4% (13)
Sediment toxicity	2% (6)
Chlorpyrifos	3% (8)
Diazinon	2% (5)

Distribution of *potential* grazing impairments?

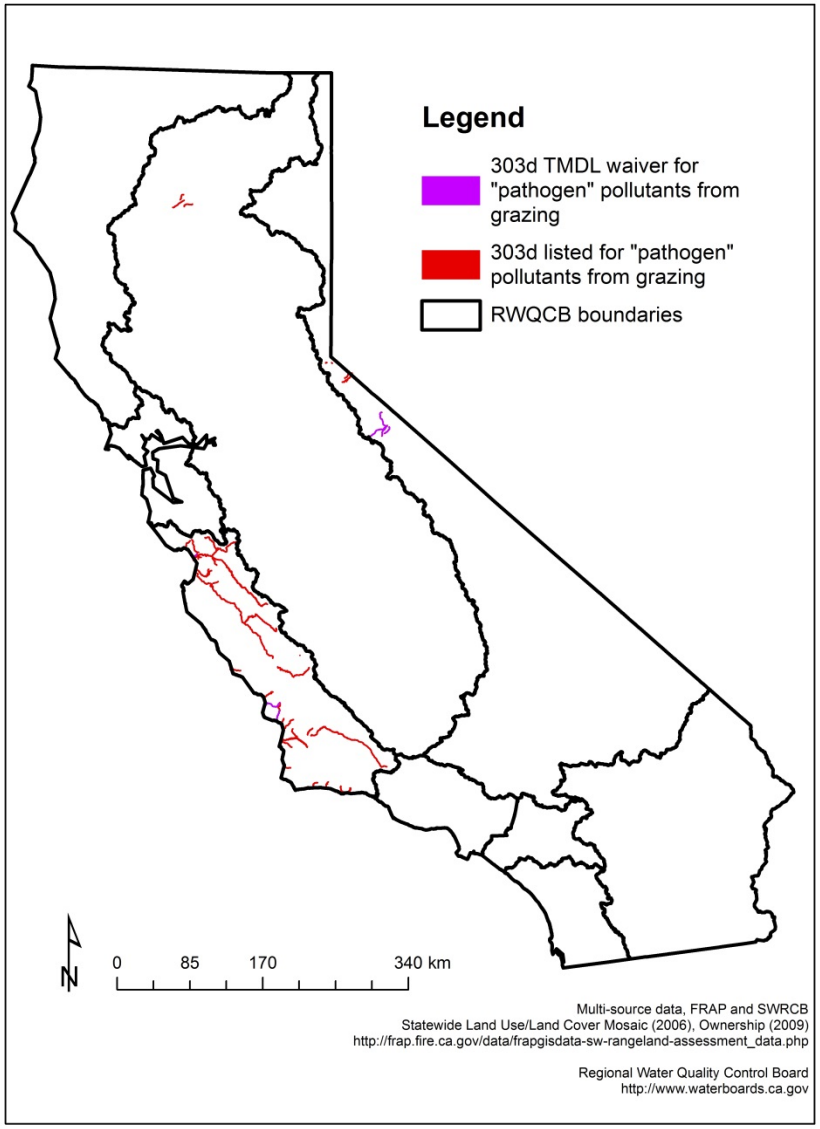


Presented at GRAP Listening Sessions

2010 303d Impaired Water Bodies

Potential grazing – pathogen impairments

29% (93) of 324 listings



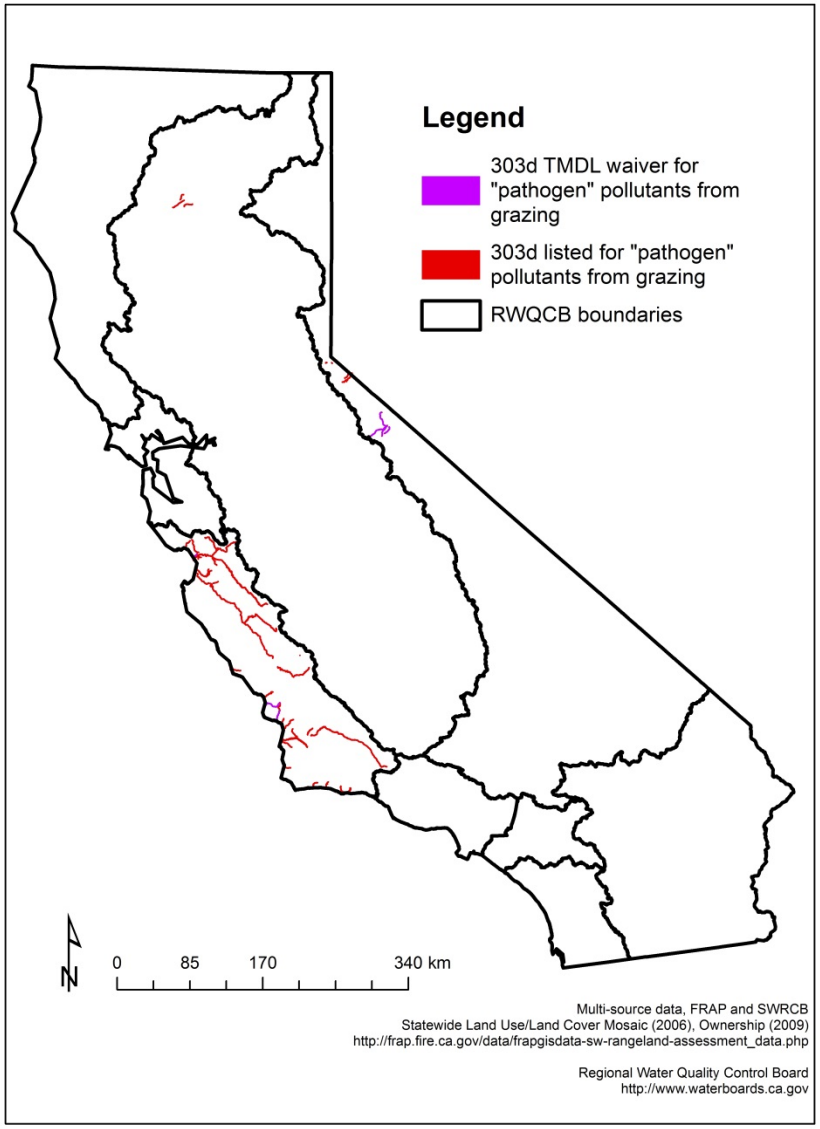
Rob Atwill & Leslie Roche

2010 303d Impaired Water Bodies

Potential grazing – pathogen impairments

29% (93) of 324 listings

Indicator	% Pathogen Listings
Fecal Coliforms	41
E. coli	29
“pathogens”	23
Enterococcus	5
Total Coliforms	2



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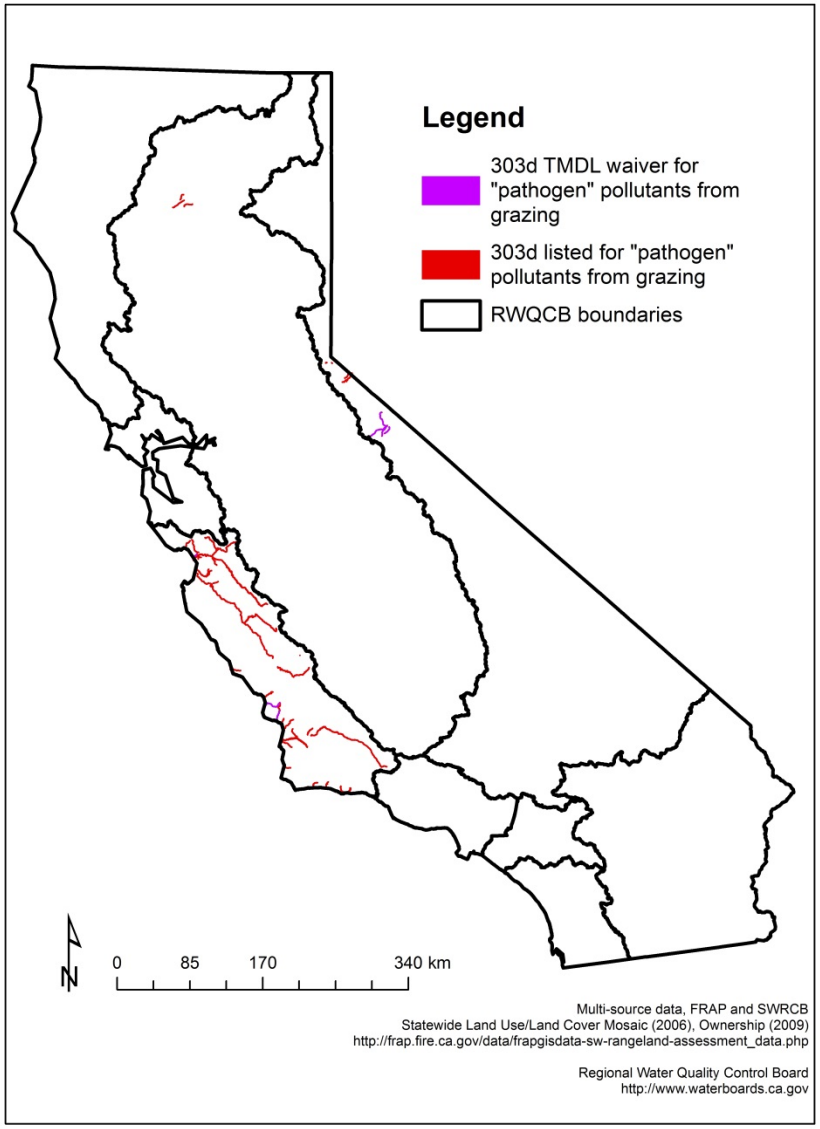
USEPA Guidance

- *E. coli* as indicator
- 100 or 126 cfu/100 mL



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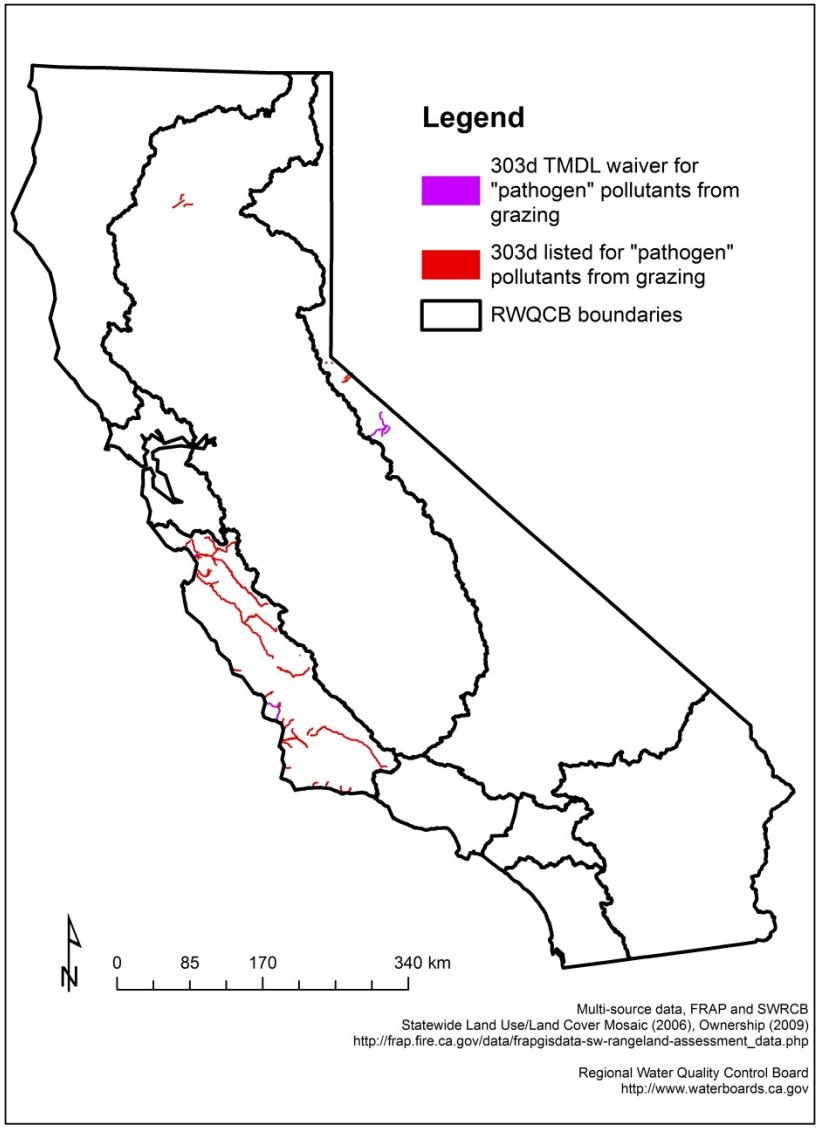
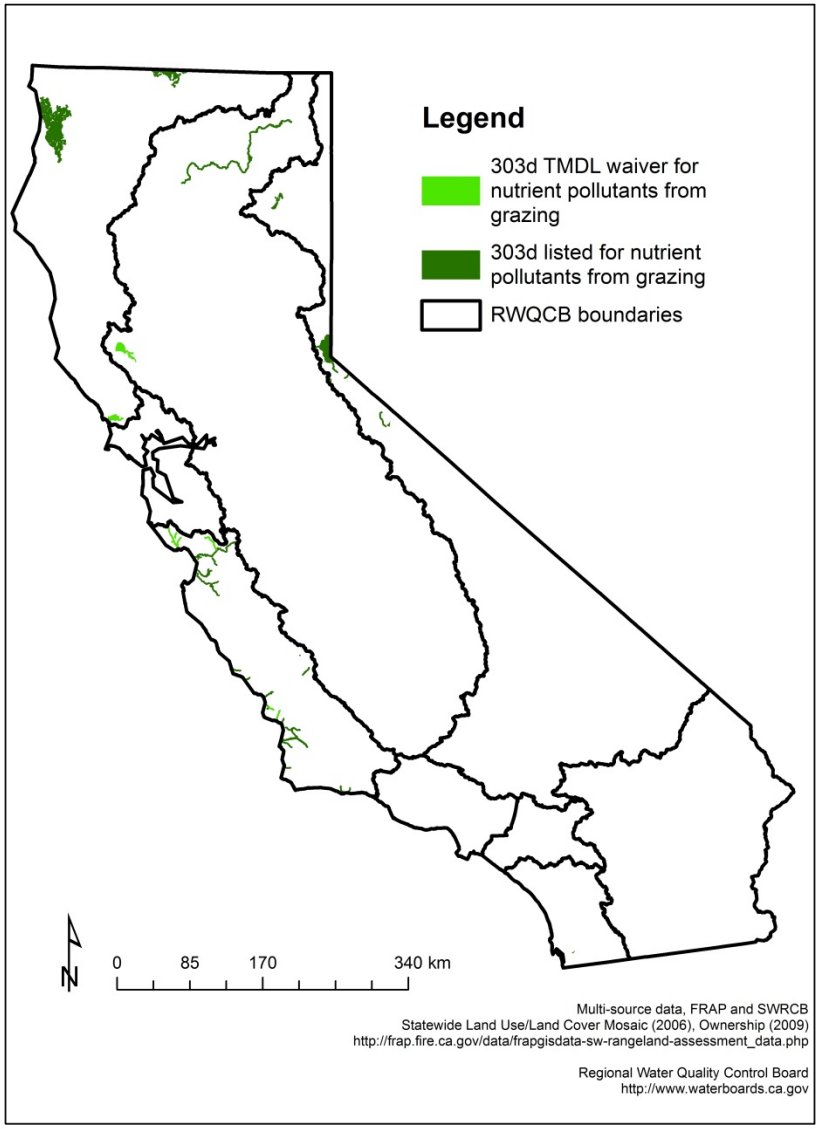


Potential grazing – nutrient impairments

23% (76) of 324 listings

- ***Nitrogen***
- ***Phosphorus***



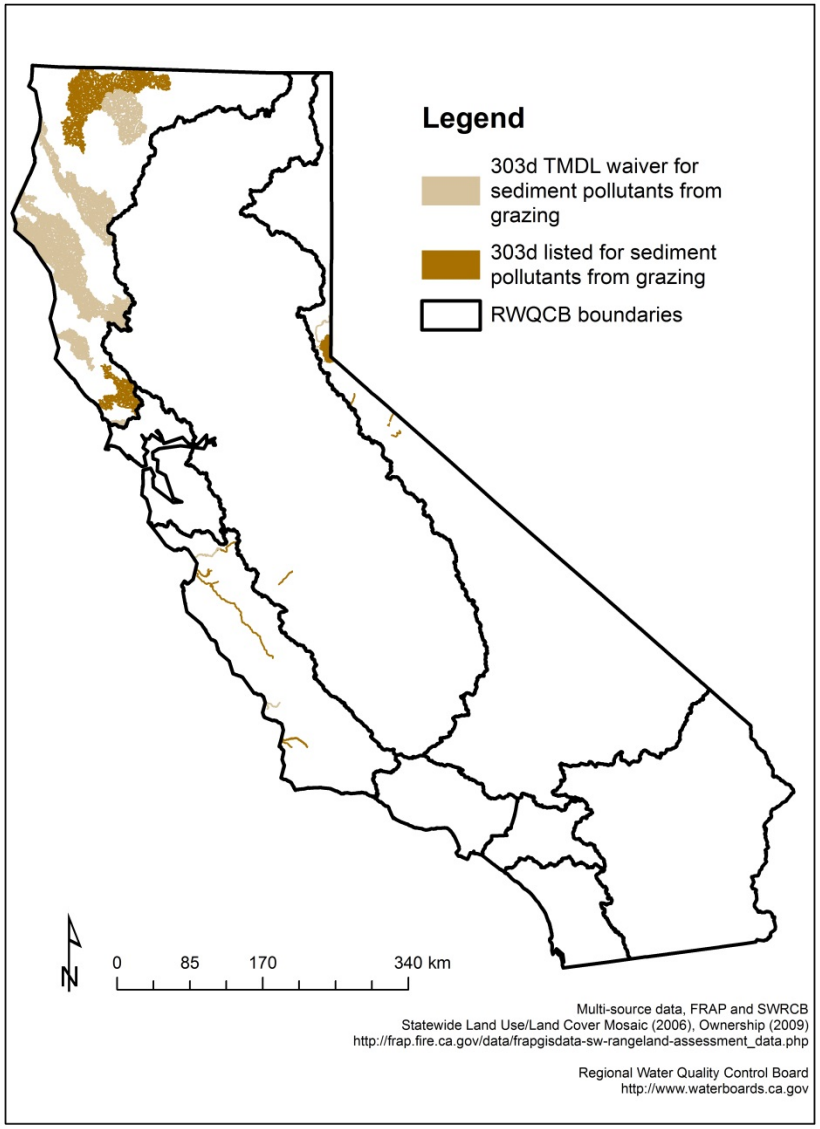
Randy Dahlgren & Leslie Roche

2010 303d Impaired Water Bodies

Potential grazing – sediment impairments

16% (52) of 324 listings

- ***turbidity***
- ***suspended solids***
- ***fines***



2010 303d Impaired Water Bodies

Rangeland Water Quality

- **25 years of partnership and progress**
  - ***CA Range WQ Management Plan***
  - ***Ranch WQ Planning Short Course***
  - ***On-ranch management practice implementation***
  - ***Supporting basic and applied research***

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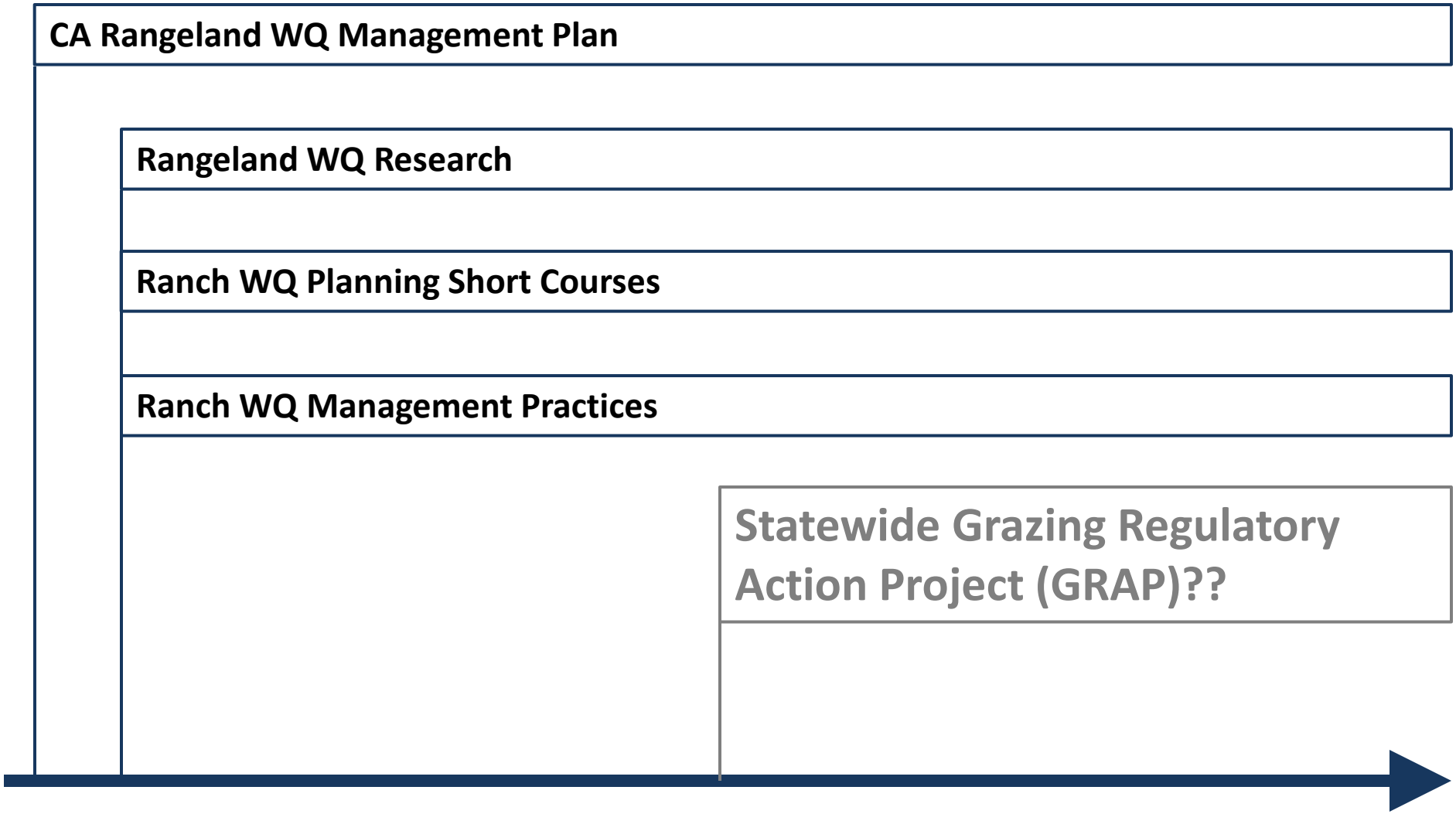
- Rangeland Watershed Program activities are vibrant and active today
- Grazing remains a minor source (~4%) of assessed WQ impairments across CA
- **It is a good time to plan for the next 25 years of proactive range WQ protection**

The next 25 years



Rangeland Watershed Laboratory
University of California Agriculture and Natural Resources
Policy Brief *March 2015*

Rangeland Water Quality Planning, Education, and Science in California

Contacts: Leslie Roche, lmroche@ucdavis.edu; David Lewis, djllewis@ucanr.edu; Morgan Doran, mpdoran@ucanr.edu; Ken Tate, kwtate@ucdavis.edu

Issue

There is substantial concern that pollution from livestock on rangelands degrades water quality, threatening human and environmental health. For the past 25 years, the Rangeland Watershed Program (RWP)—a diverse partnership of rangeland stakeholders—has developed and implemented an integrated research, education, and planning program to proactively address this concern. Active partners include ranchers, the University of California, USDA Natural Resources Conservation Service, resource conservation districts, Board of Forestry and Fire Protection's Range Management Advisory Committee, conservation groups, and Regional Water Boards were founding partners of this process.

The initial outcome of the RWP partnership was California's Rangeland Water Quality Management Plan (CRWQMP). The Plan outlines science-based management strategies to prevent water quality impairments, and provides for educational programs to develop on-ranch water quality protection strategies. As a result, the Ranch Water Quality Management Planning Short Course was developed to provide comprehensive guidance and support for ranchers to develop on-ranch water quality plans. The Short Course and resulting ranch plans have been used to comply with State and

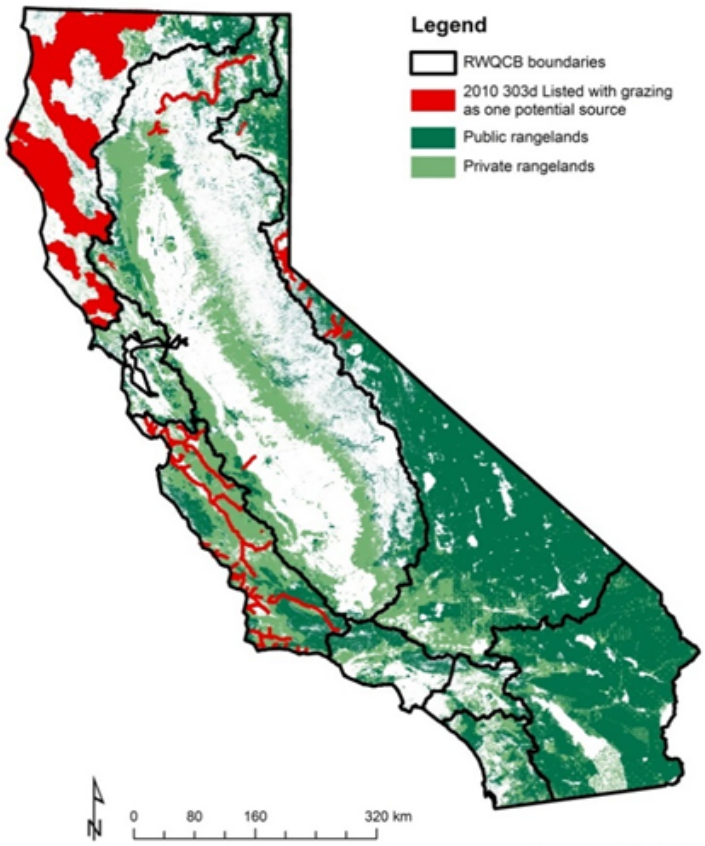


Figure 1: Map highlighting extent of California's public and private rangelands, and regional scope of water quality impairments with grazing listed as one potential source.