

Watersheds: Climate Smart Water Solutions



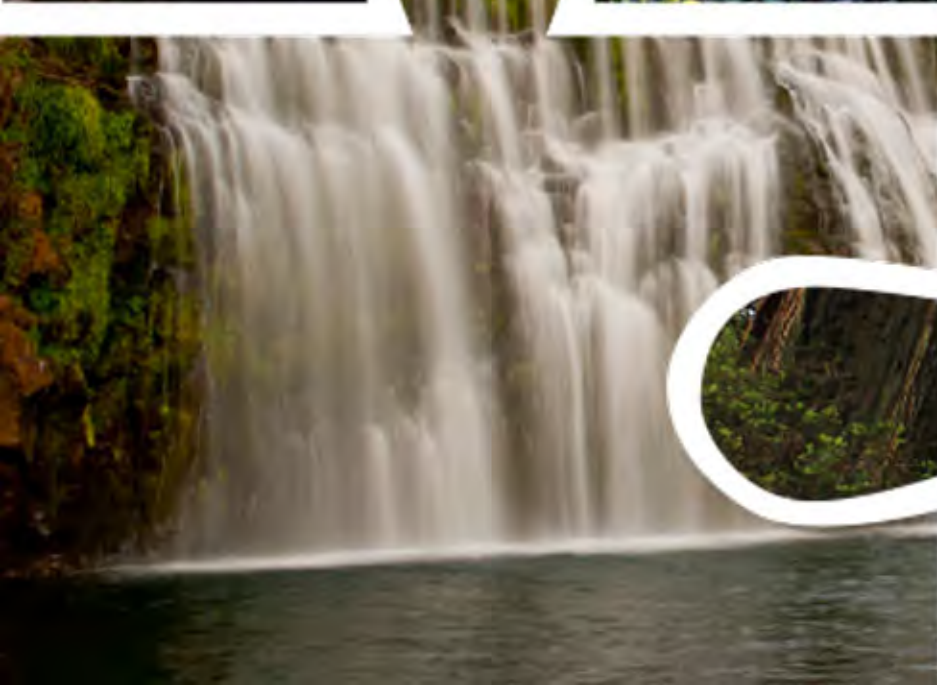
Sustaining Colorado's Watersheds: 2019



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Where does California's water come from?



- The Klamath-Cascade region provides:
- 60% of irrigated agriculture water
 - 80% of freshwater into SF Bay
 - 45% of LA and 20% San Diego's drinking water
 - Drinking water for 28 million people



California's Natural Water Infrastructure

Problem:

- Sub-optimal watershed health threatens water supply
- Water policy and financing focuses on built infrastructure
- Funding for watershed conservation and restoration is insufficient and inconsistent

Result:

- Catastrophic floods (Oroville 2016-17), fires (2017-18), diminished water and hydro-power supplies
- More chaotic and costly water and power



California's Natural Water Infrastructure

Solutions:

- *AB2480 - designate watersheds as water system infrastructure, ability to finance as such;*
- *AB2551-recognize key source watersheds for action, create source watershed fund; calls for comprehensive implementation planning*

New, innovative, and cost effective financing model for comprehensive watershed restoration and conservation

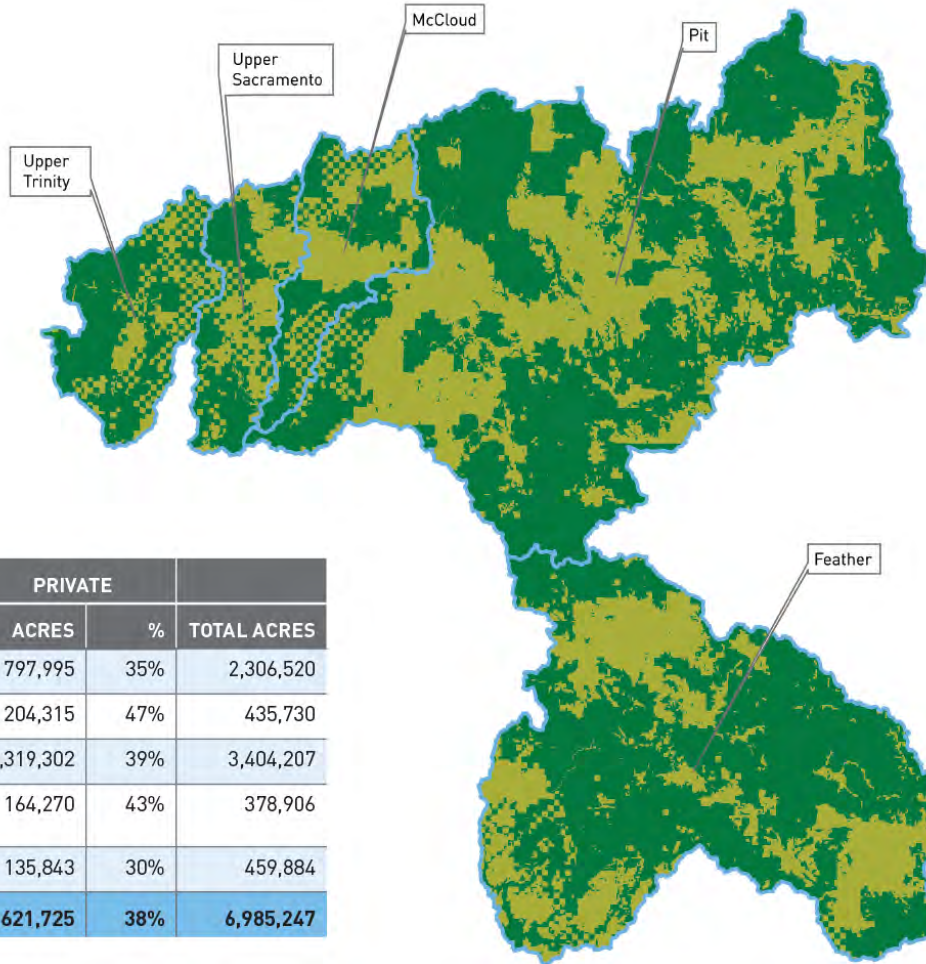
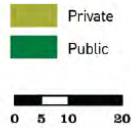
Result:

- ***Enhanced water security, quantity, quality for California in an era of drought and climate change***



Five Key Watersheds

PUBLIC / PRIVATE OWNERSHIP

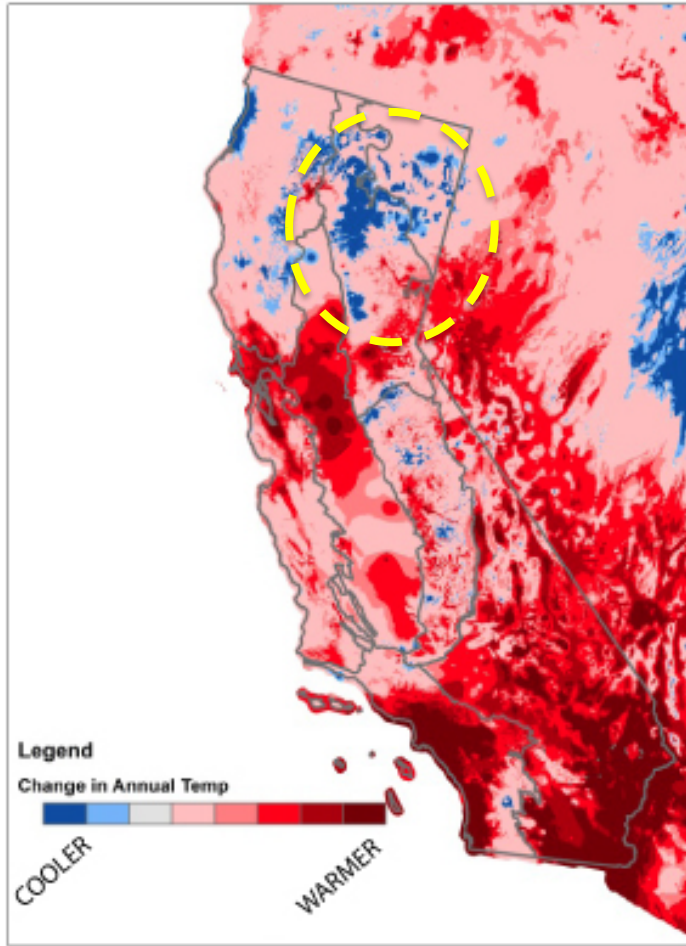


WATERSHED	PUBLIC		PRIVATE		TOTAL ACRES
	ACRES	%	ACRES	%	
Feather	1,508,525	65%	797,995	35%	2,306,520
McCloud	231,415	53%	204,315	47%	435,730
Pit	2,084,905	61%	1,319,302	39%	3,404,207
Upper Sacramento	214,636	57%	164,270	43%	378,906
Upper Trinity	324,041	70%	135,843	30%	459,884
Total	4,363,522	62%	2,621,725	38%	6,985,247

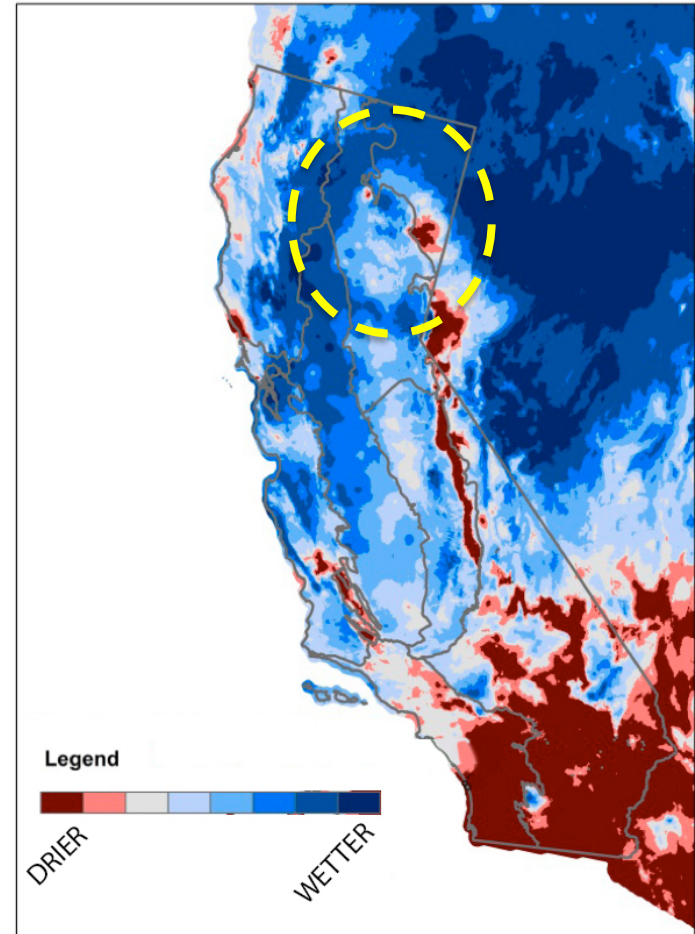


20th Century Climate Change in CA

Temperature Change:



Precipitation Change:



KC is projected to remain cooler & wetter than rest of California

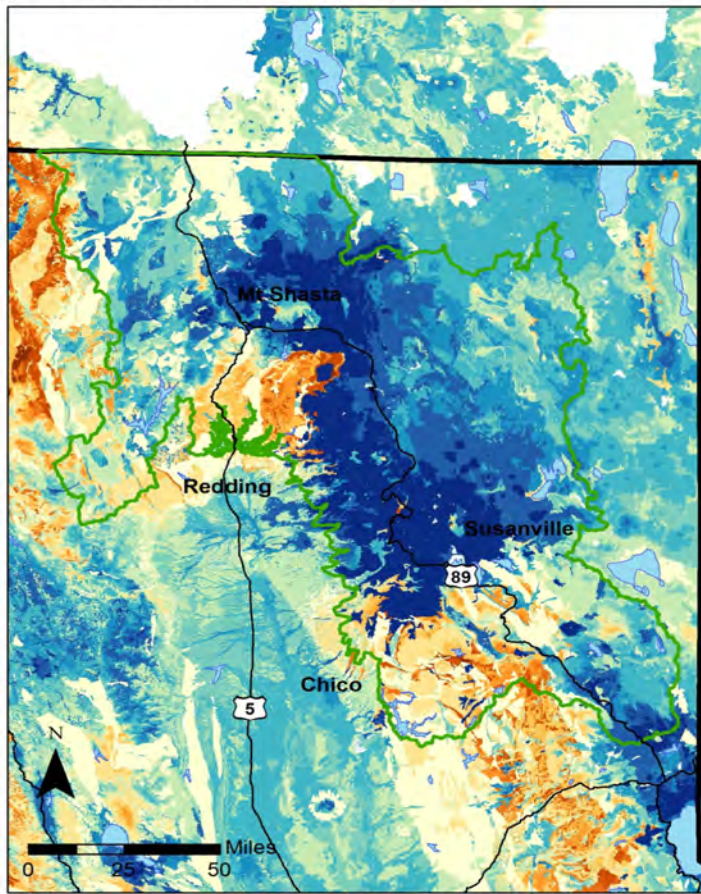
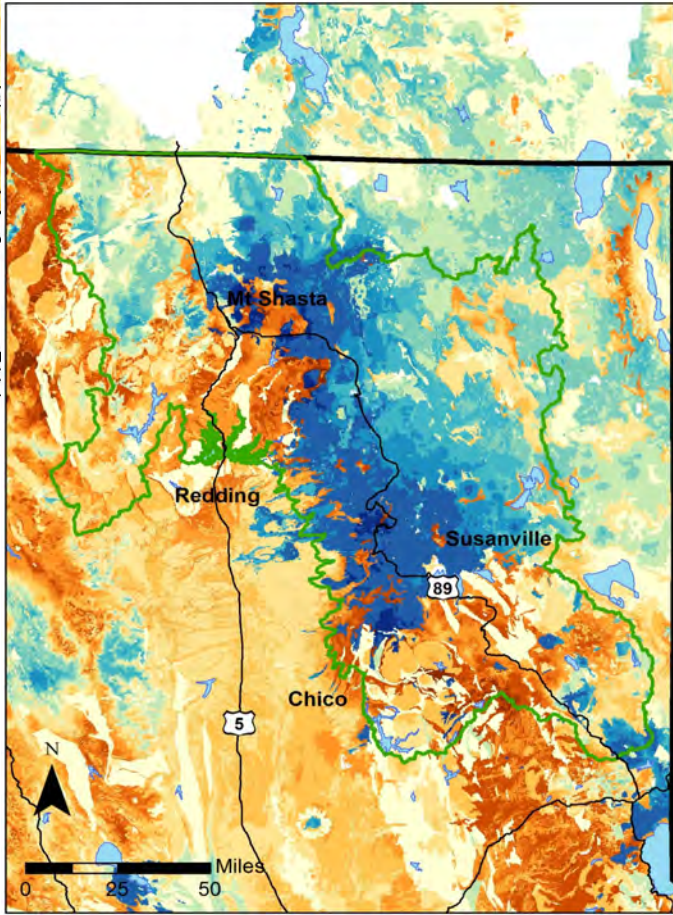
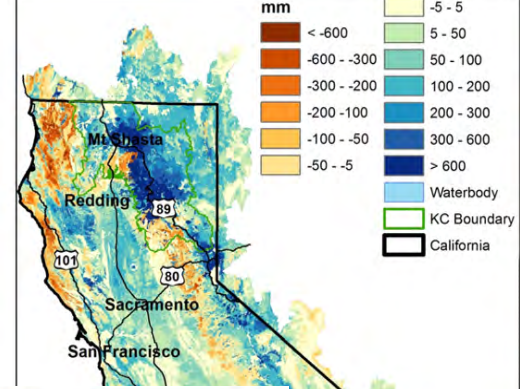
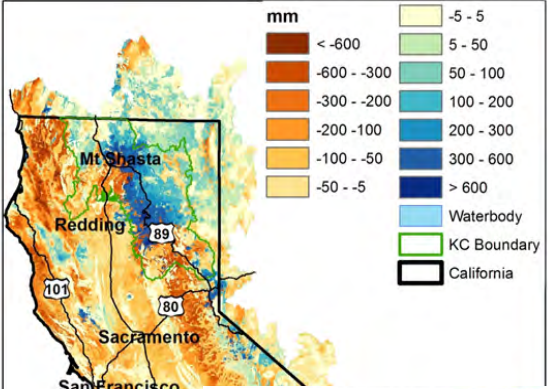


Recharge

Change

1981-2010 to 2070-2099

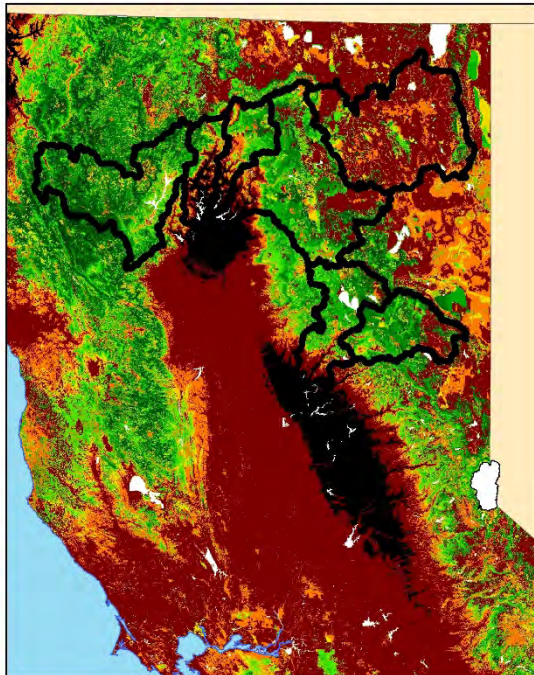
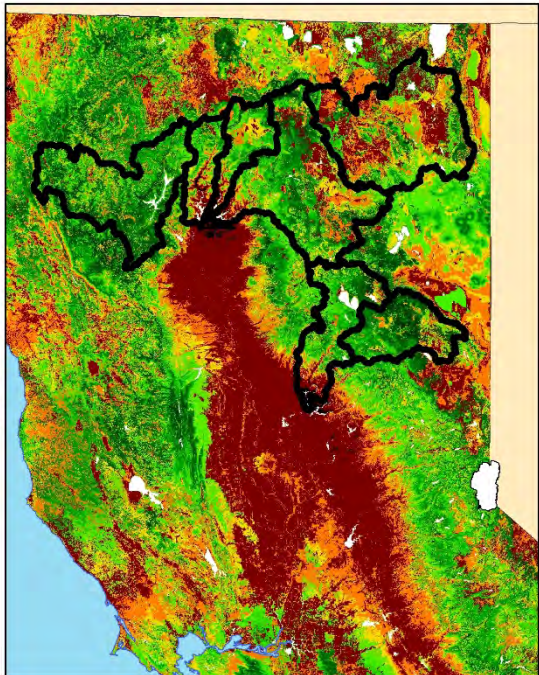
MIROC ES M RCP 8.5 CNRM RCP 8.5



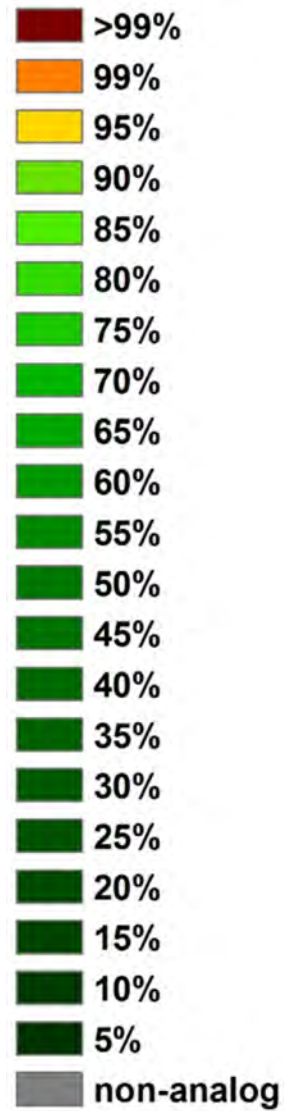
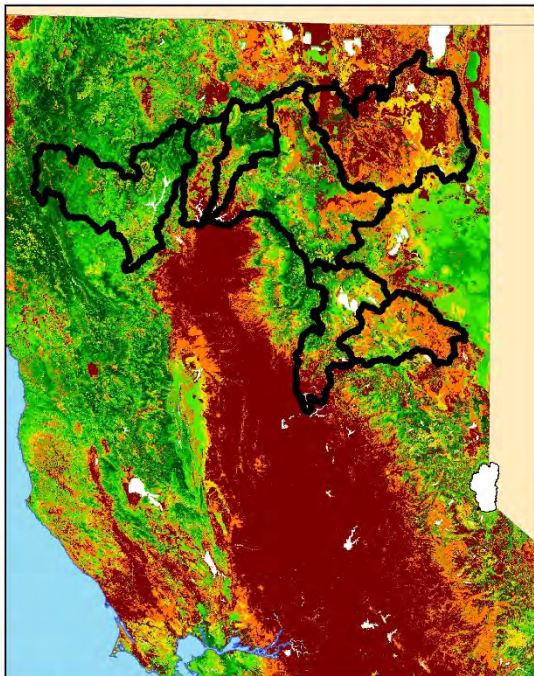
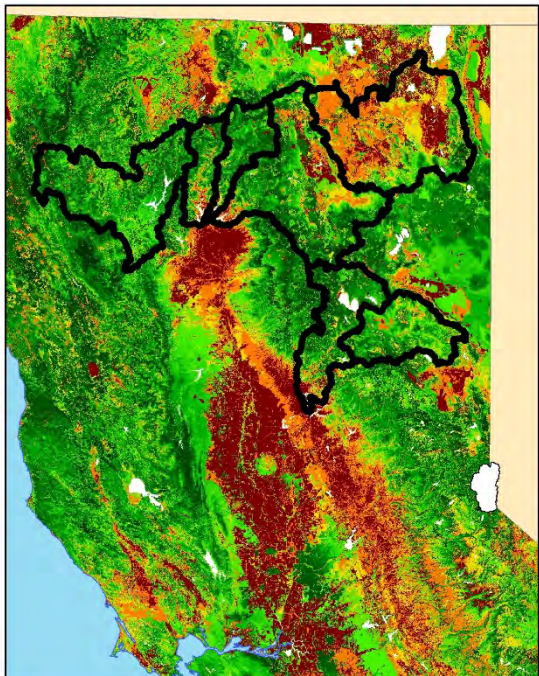
Lower Emissions

Higher Emissions

Warm and Wet



Hot and Dry



Solution: Restore more water- and carbon-rich forests



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Solution: Restore degraded streams



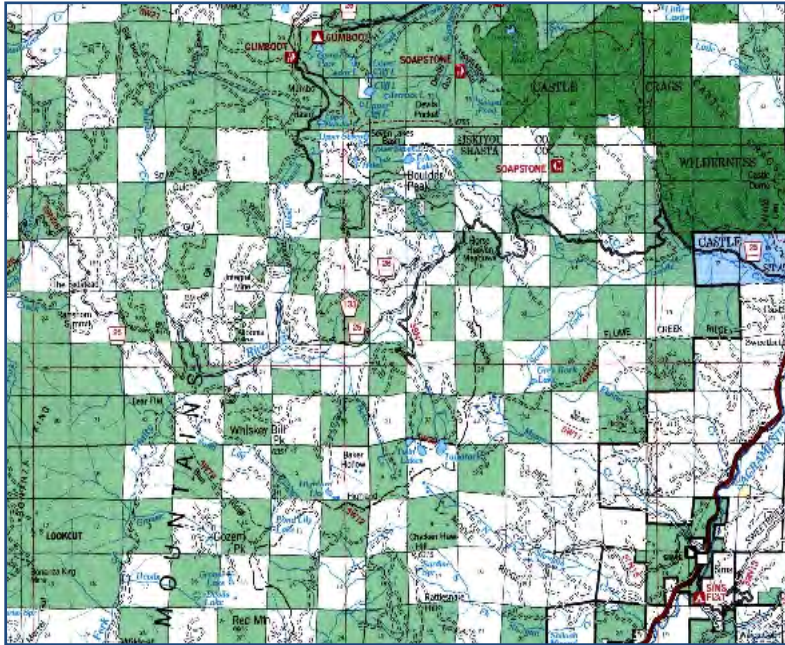
Solution: Restore Wet Meadows



Solution: Reduce Sediment Delivery



Solution: Manage across Boundaries



Keep watersheds whole



Imagery ©2016 Google, Map data ©2016 Google 1000 ft



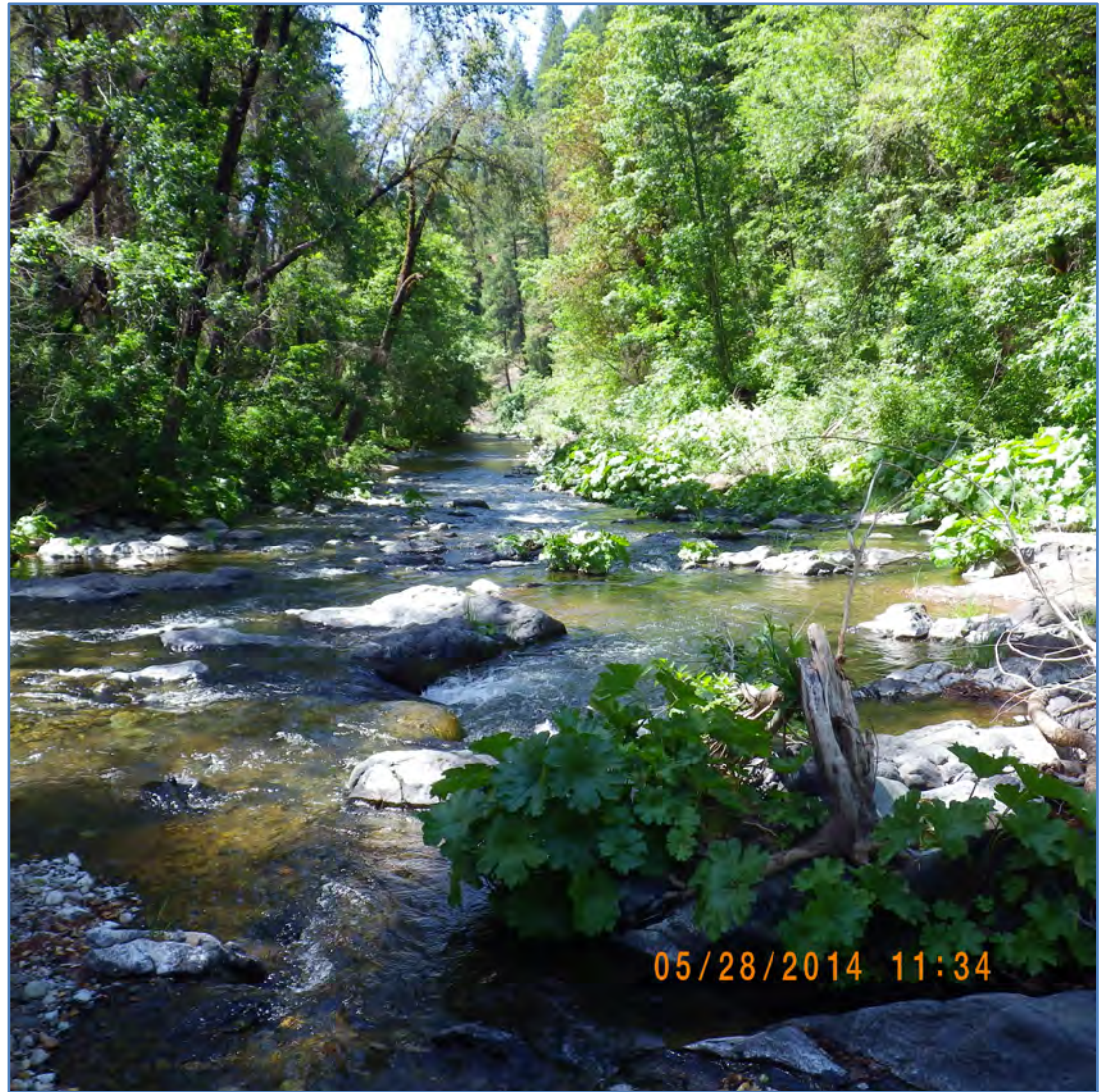
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Resiliency








Spring 2013



Squaw Creek May 2014



Essential Actions to Enhance Resilience

WATERSHED CHARACTERISTIC	RESTORATION ACTIVITY	WATER BENEFITS OF RESTORATION
 Forests	Mechanical thinning	Increased water yield, greater capture, and retention of precipitation (mist, rain, snow), prolonged release of snowmelt, decreased peak run-off, prevention of post-wildfire erosion, increased soil moisture, improved water quality
	Prescribed burning	Increased water yield, greater penetration of precipitation, delayed/prolonged release of snowmelt, reduced fire intensity, prevention of post-catastrophic wildfire erosion, improved water quality
 Meadows	Removal of encroaching conifers	Increased water yield, raised water table
	Restoration of wet meadow hydrological function and stream channel integrity via pond-and-plug, check dams, channel reconstruction, stream bank stabilization	Flood attenuation, increased flow reliability, prolonged dry-season base flows with extended summer release, reduced erosion, improved water quality
	Realignment of unpaved roads and trails intersecting wet meadows	Reduced erosion and channel incision, improved water quality
 Streams	Restoring natural stream channels; herd management in grazing allotments and exclusionary fencing	Reduced erosion, stream channel protection, improved water quality, reduced flood events
 Roads and Trails	Upgrading unpaved roads, especially those in stream buffers	Reduced erosion and sediment delivery to watercourses, improved water quality
	Decommissioning roads (federal lands)	Reduced erosion and sedimentation, improved water quality
 Integrity/Intactness	Acquisition of conservation easements (private lands)	Protection of long-term watershed function via secured land base



Work with the Whole

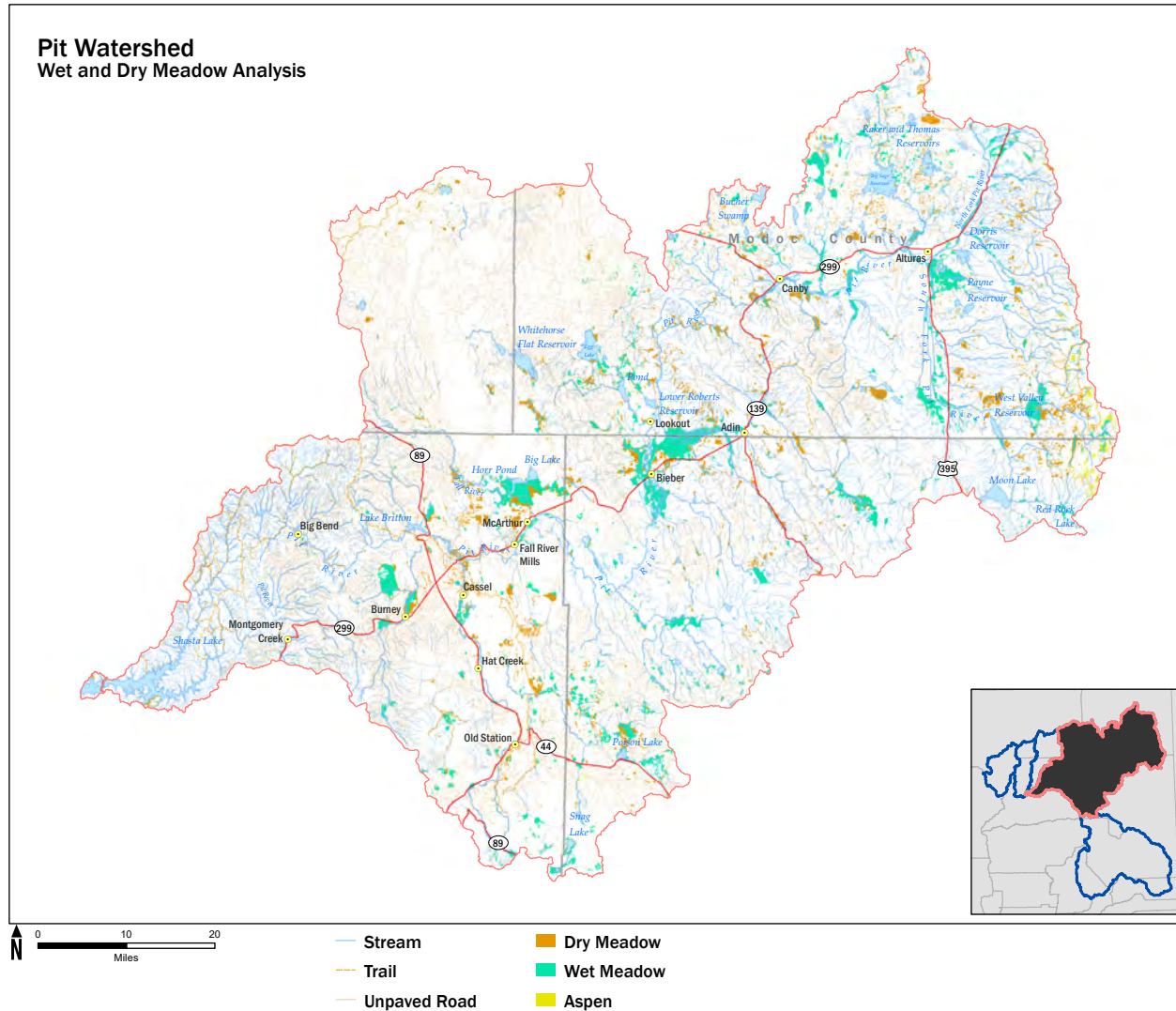


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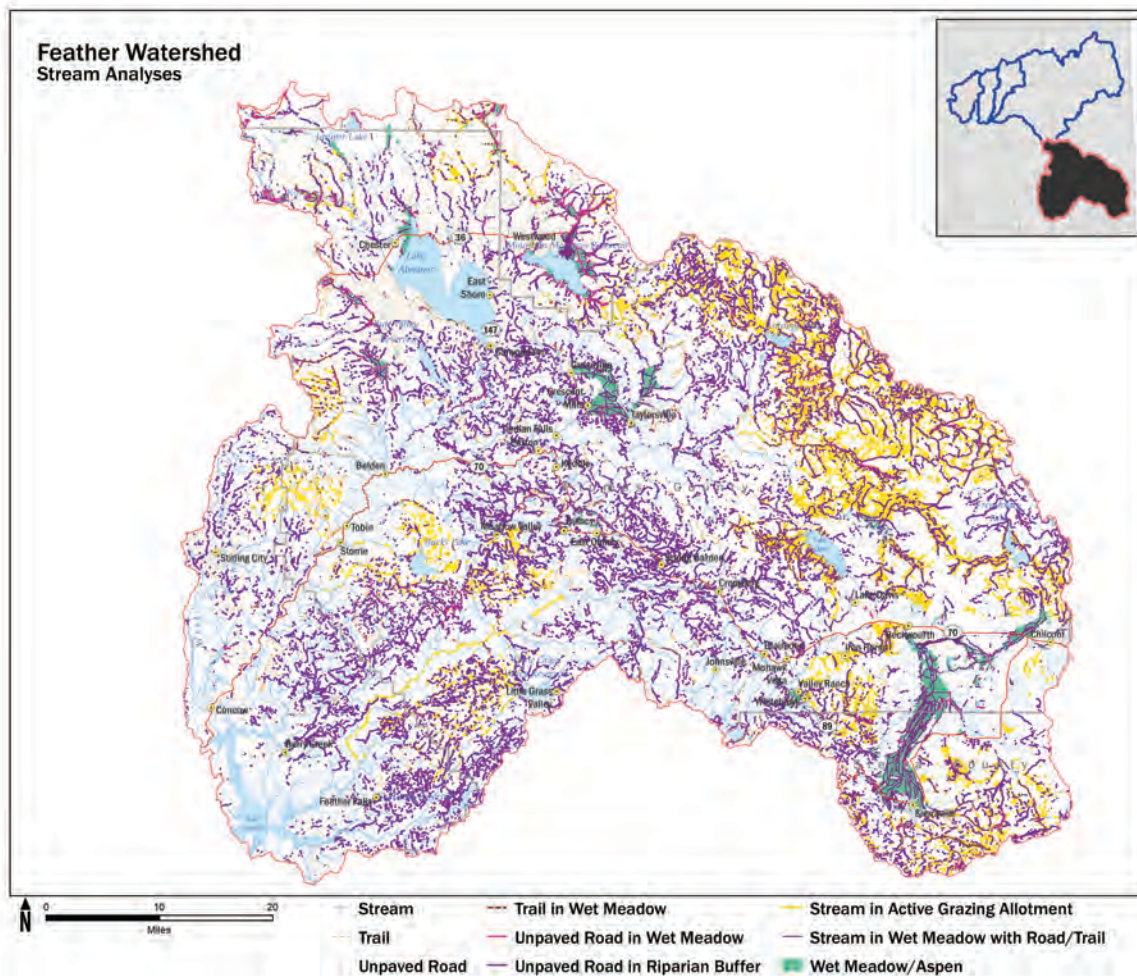


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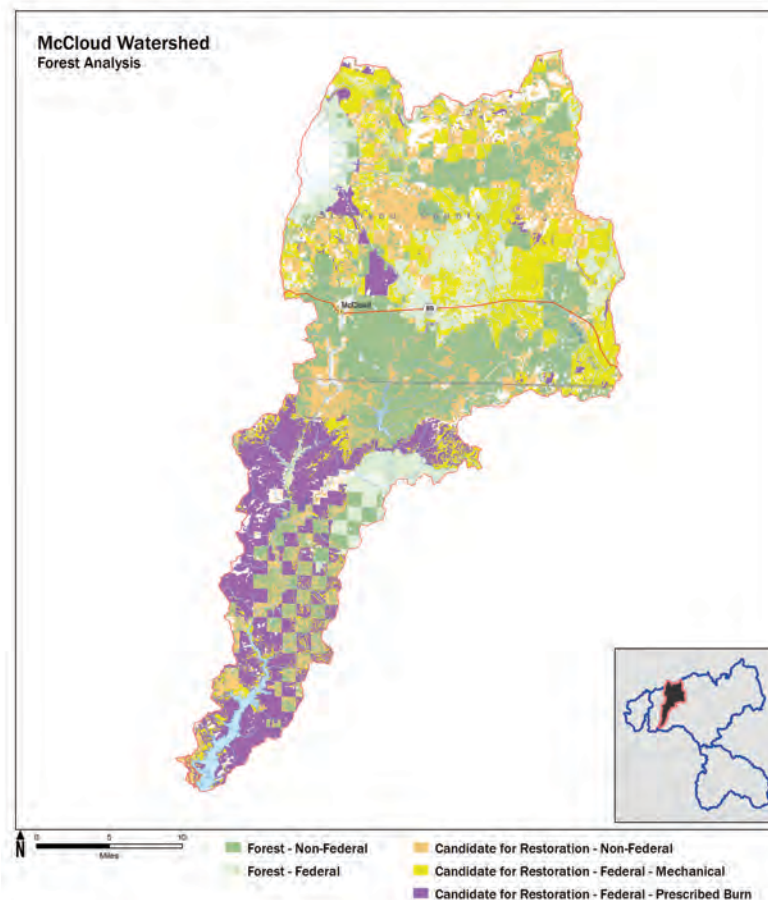
Pit Watershed Meadow Analysis



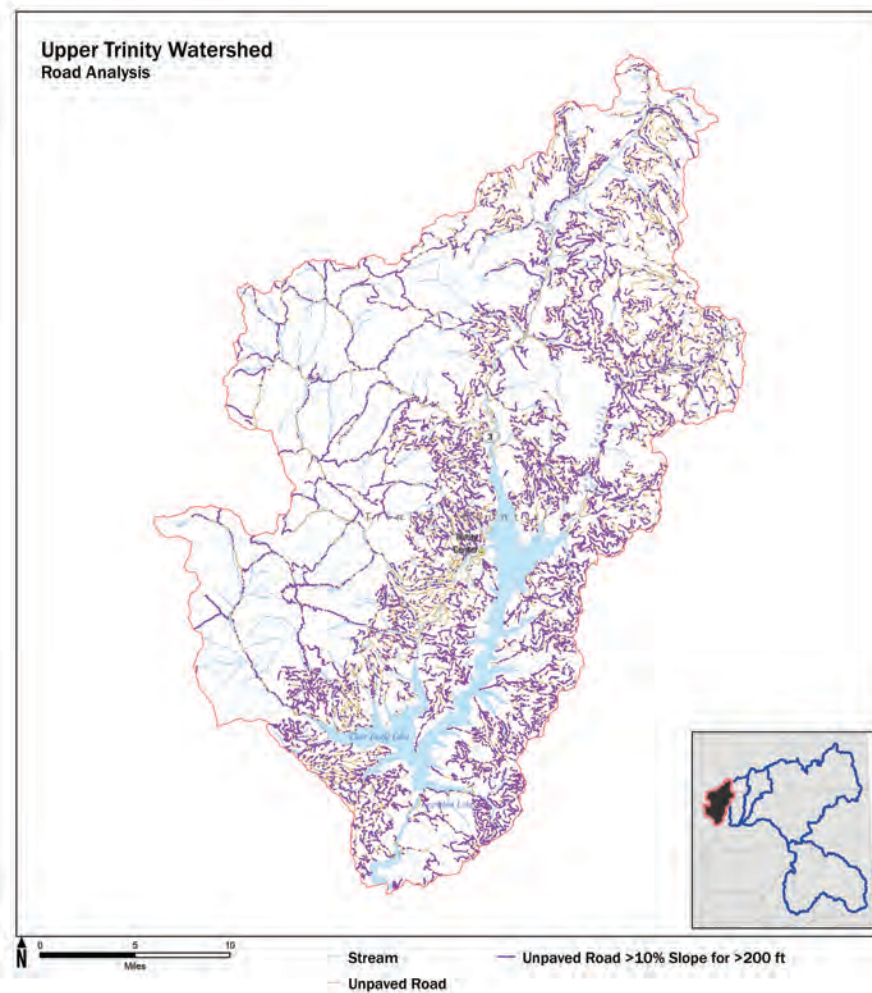
Feather River Stream Analysis



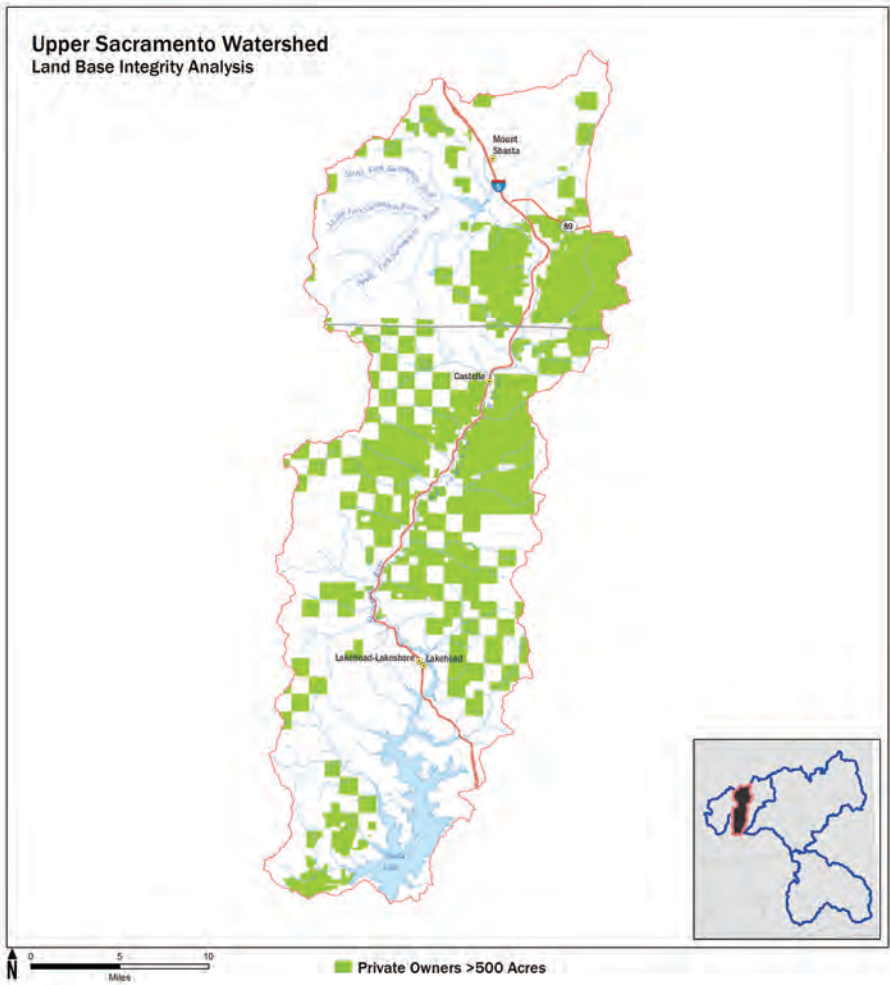
McCloud Watershed: Forest Restoration



Trinity Road Analysis



Upper Sacramento Land Integrity



	Total Restoration Action Units					TOTAL
	Feather	McCloud	Pit	Upper Sac	Upper Trinity	
Forest Management						
Mechanical (acres)	750,578	147,918	1,024,322	140,270	140,839	2,203,928
Prescribed Fire (acres)	851,894	175,832	957,990	172,231	240,918	2,398,865
Meadows						
Dry - Conifer Removal (acres)	65,561	2,351	114,339	3,111	3,707	189,068
Wet/Aspen - Conifer Removal (acres)	72,470	1,286	124,907	1,901	2,447	203,010
Wet - Direct Hydrological Restoration (miles)	928	19	1,140	23	42	2,153
Wet - Road/Trail Realignment (miles)	135	5	299	6	18	464
Streams						
Livestock Fencing In Active Grazing Allotments (miles)	572	34	1,523	4	12	2,144
Roads						
Decommissioning (miles)	198	46	65	30	55	394
Upgrading - Unpaved segments >200 ft and >10% slope (miles)	990	325	929	517	577	3,339
Upgrading - Unpaved segments In Stream Buffers (miles)	2,595	429	1,805	406	517	5,752
Land Base						
Conservation Easements (acres)	414,202	110,137	775,775	105,330	66,859	1,472,302



Who is Paying: 2017

Table 1- Current Annual Costs of Holding and Maintaining Key Source Watersheds (\$millions)							
Cost Category	Example Activities	Private Land Owners	Taxpayers				Total
			CA	USFS	Other Federal	County	
Natural Resources	veg. + wildlife management, restoration, fire preparedness	20.7	22.2	38.5	7.1		\$88.6m
Access & Public Safety	access roads, fire suppression, law enforcement	18.8	26.4	55.7	0.1	7.7	\$108.8m
General Holding	administration, property taxes/PILT, fire damages	43.3	1		3.9		\$48.2m
Total		\$82.9m	\$49.6m	\$94.2m	\$11.1m	\$7.7m	\$246m

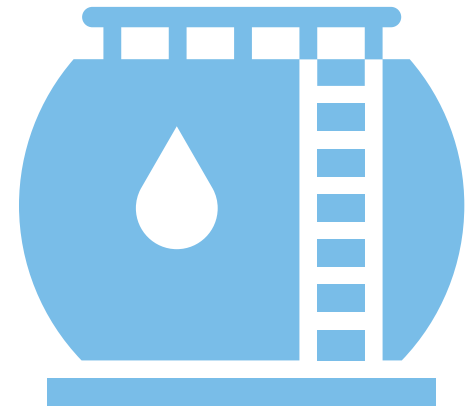
Who Benefits?



Cost of Natural Infrastructure vs. Built Infrastructure Example: New York City



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\$1.5 billion investment in natural infrastructure – conserving and restoring primary watershed in Catskills Mountains

\$8 billion in new water filtration and storage facilities



Healthy Watersheds California: Outcomes



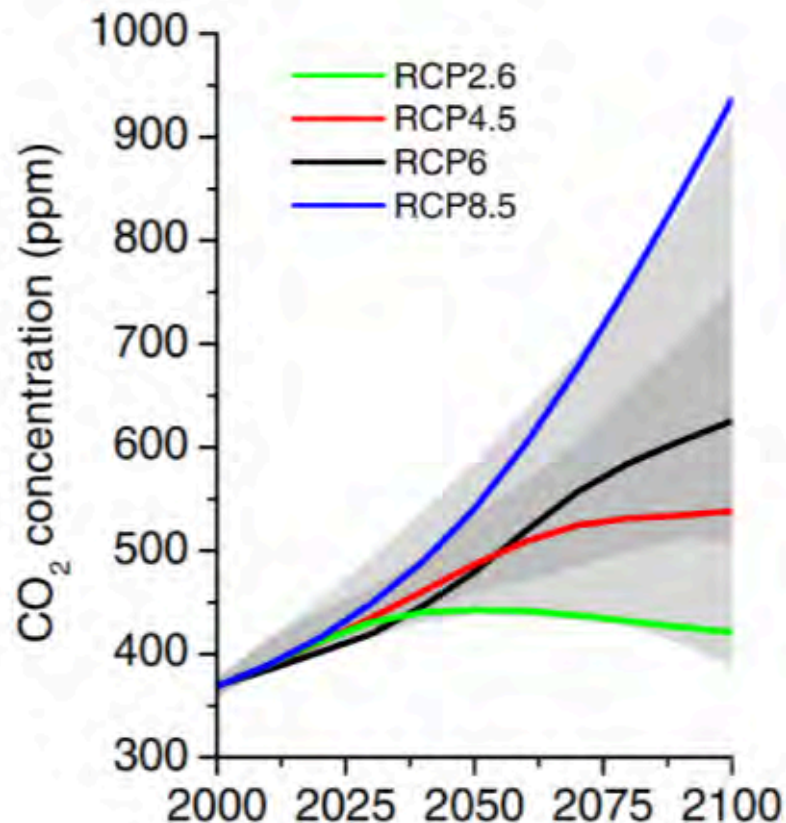
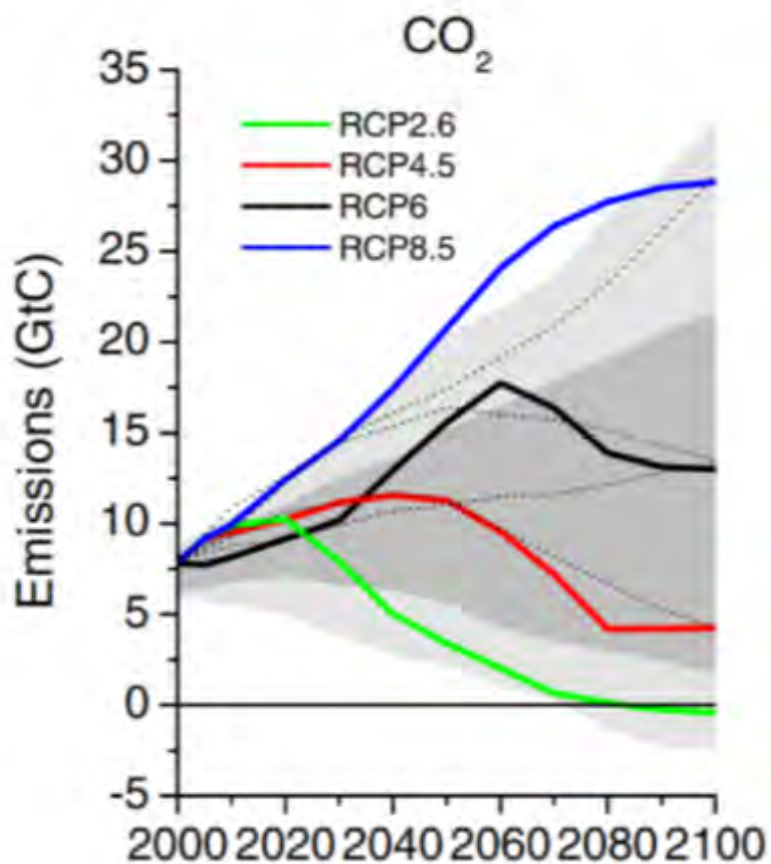
- 75%-85% of key watersheds are secured & restored
- Water security for a growing California
- Climate resilient water supplies



Win – Win – Win – Win Solution



BENDING THE CURVE



Thank You!



For further info: Laurie Wayburn: lwayburn@pacificforest.org



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