

Hydromodification Regulations in California

*San Diego Hydromodification
Workshop
August 30, 2012*

*eric berntsen
stormwater program/SWRCB*



Our Mission and Framework

- "Our mission is to preserve and enhance the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations."
- *Q: Why are we so focused on discharges?*
- *A: The legal framework (Clean Water Act) drives us to be discharge-oriented.*

The Clean Water Act

- Passed in 1972, it set goals for all “waters of the United States” to:
 - be free of all discharges causing pollution; and
 - be “fishable, swimmable,” meaning they support these use
- Is similar/analogous to our CA Water Code

Beneficial Uses Used to Protect California Water Resources

- **AGR** - Agricultural Supply
 - **FLD** - Flood Peak Attenuation/Flood Water Storage
 - **FRSH** - Freshwater Replenishment
 - **GWR** - Groundwater Recharge
 - **MAR** - Marine Habitat
 - **MUN** - Municipal and Domestic Supply
 - **RARE** - Preservation of Rare and Endangered Species
 - **REC-1** - Water Contact Recreation
 - **REC-2** - Non-Water Contact Recreation
 - **SHELL** - Shellfish Harvesting
 - **SPAWN** - Fish Spawning
 - **WARM** - Warm Freshwater Habitat
 - **WILD** - Wildlife Habitat
 - **WQE** - Water Quality Enhancement
- 
- A brown crane is standing in a wetland area, surrounded by tall reeds and shallow water. The crane is facing right, and its reflection is visible in the water. The background is a dense thicket of reeds, creating a natural, serene setting.

Sources of Impairment (USEPA 2006)

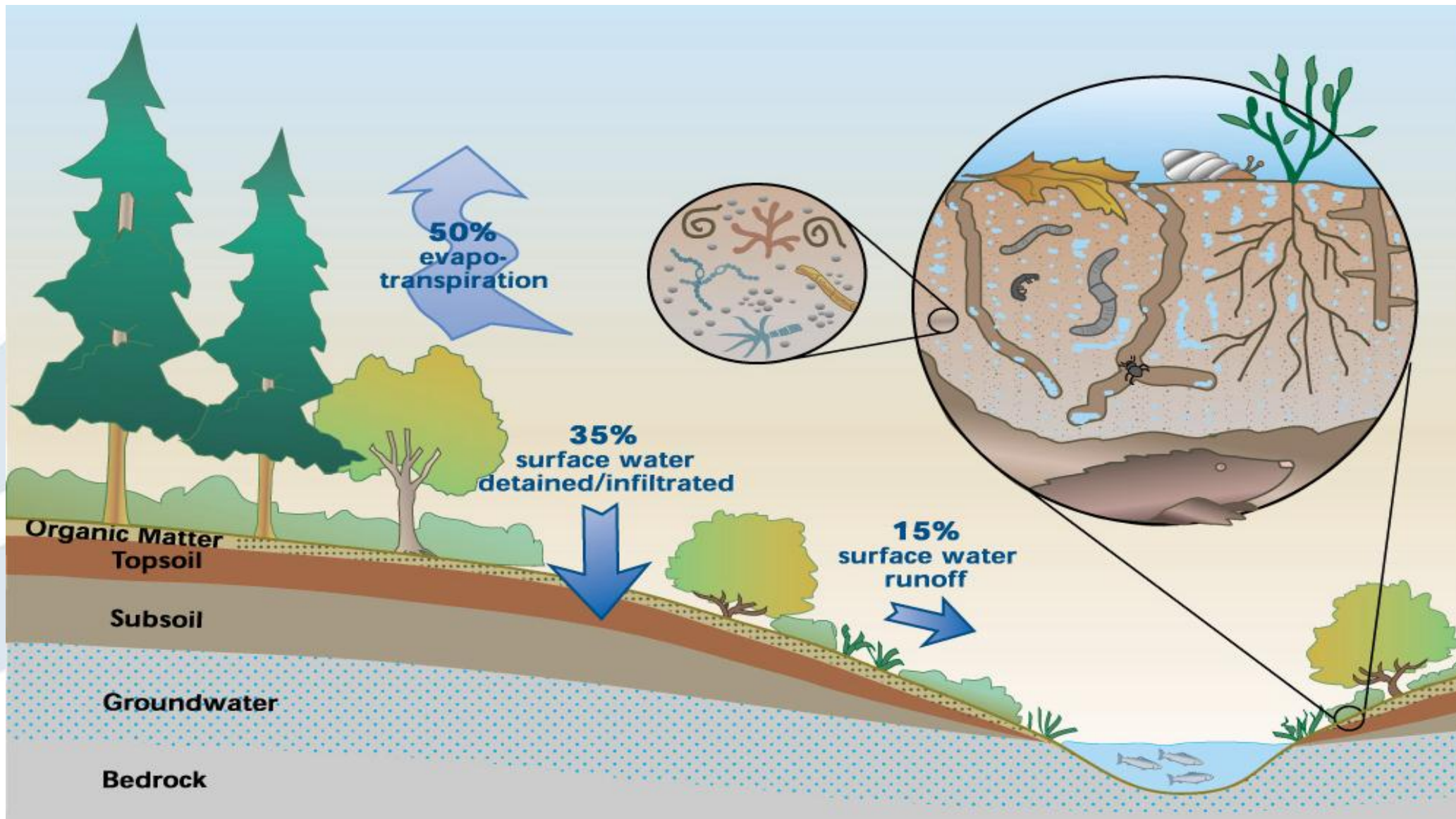
	Rivers and Streams	Lakes, Ponds, and Reservoirs	Estuaries
Sources ^b	Agriculture (48%) ^a	Agriculture (41%)	Municipal Point Sources (37%)
	Hydrologic Modification (20%) ^c	Hydrologic Modification (18%)	Urban Runoff/Storm Sewers (32%)
	Habitat Modification (14%) ^d	Urban Runoff/Storm Sewers (18%)	Industrial Discharges (26%)
	Urban Runoff /Storm Sewers (13%)	Nonpoint Sources (14%)	Atmospheric Deposition (23%)
	Forestry (10%)	Atmospheric Deposition (13%)	Agriculture (18%)
	Municipal Point Sources (10%)	Municipal Point Sources (12%)	Hydrologic Modification (14%)
	Resource Extraction (10%)	Land Disposal (10%)	Resource Extraction (12%)

Sources of Impairment - Urban Stormwater (me 2012)

Year	Acres_Impaired	Miles_of_Streams /Rivers_Impaired
1992	239,423.00	633.00
1994	254,197.00	739.00
1996	262,457.00	1,351.00
1998	521,249.00	1,426.66
2002	781,780.33	3,845.33
2006	806,817.83	4,582.79
2010	871,144.77	5,037.70

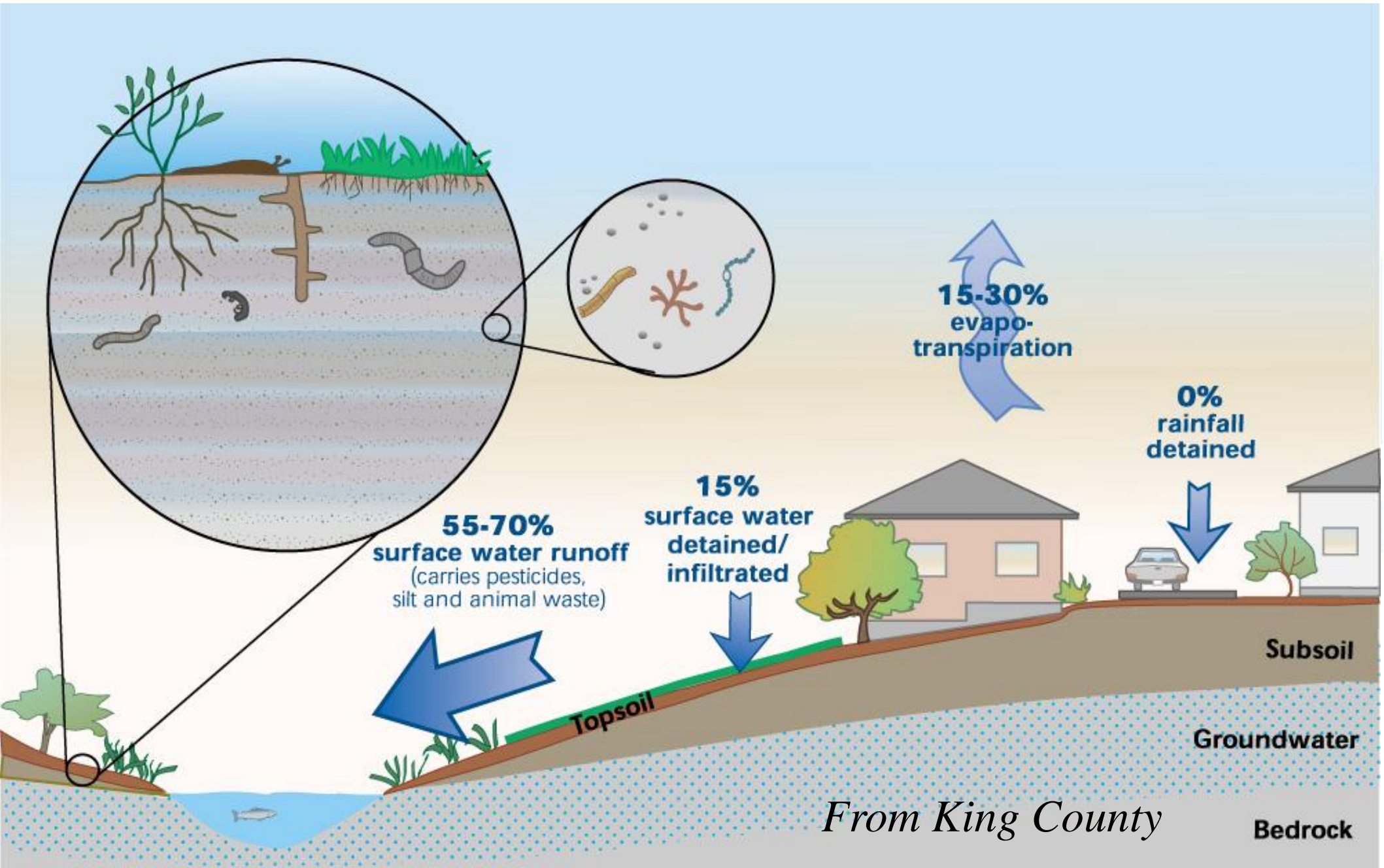


Native Soil



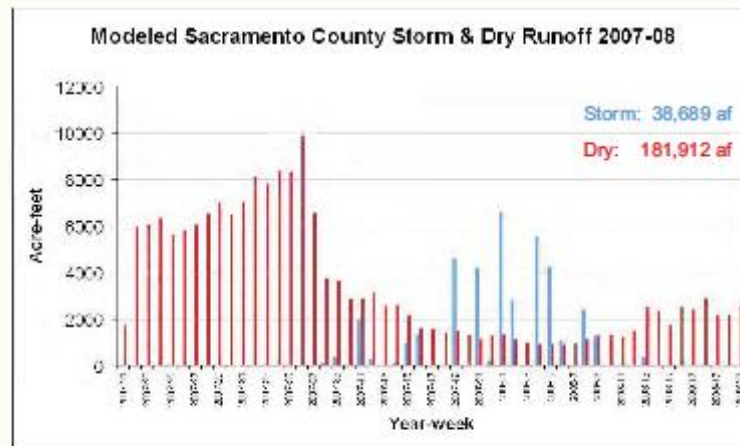
From King County

Disturbed Soil



From King County

Storm + Dry weather runoff... It adds up!



Dry Weather Runoff: 181,912 af

- Is approximately equivalent to:
 - Pyramid Lake (SoCal)... 171,000 af
 - Lake Matthews 182,000 af
 - New Spicer 189,000 af
 - Pardee 198,000 af

- ...Or about half of:
 - Hetch Hetchy 360,000 af
 - Lake Sonoma 381,000 af

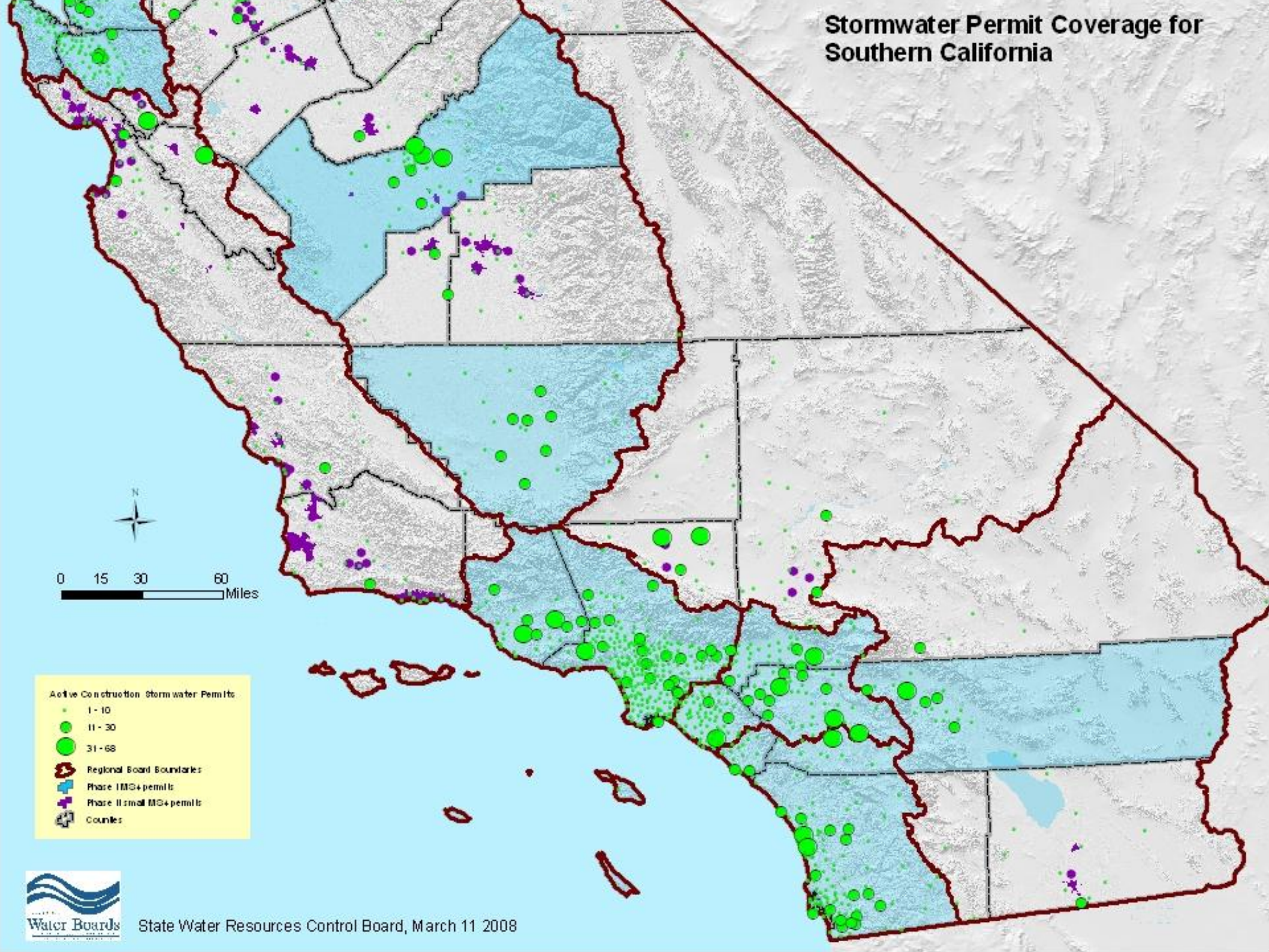
1 af = 1 family per year

Oki 2009

CWA - Permits

- Section 402 - Point Sources
 - The National Pollutant Discharge Elimination System (NPDES) - applies to all point sources of pollutants
 - Stormwater outfalls are considered "point sources" and these regulations apply to:
 - Industrial Sources (including Construction Activities)
 - Municipal Sources (large and small communities)

Stormwater Permit Coverage for Southern California

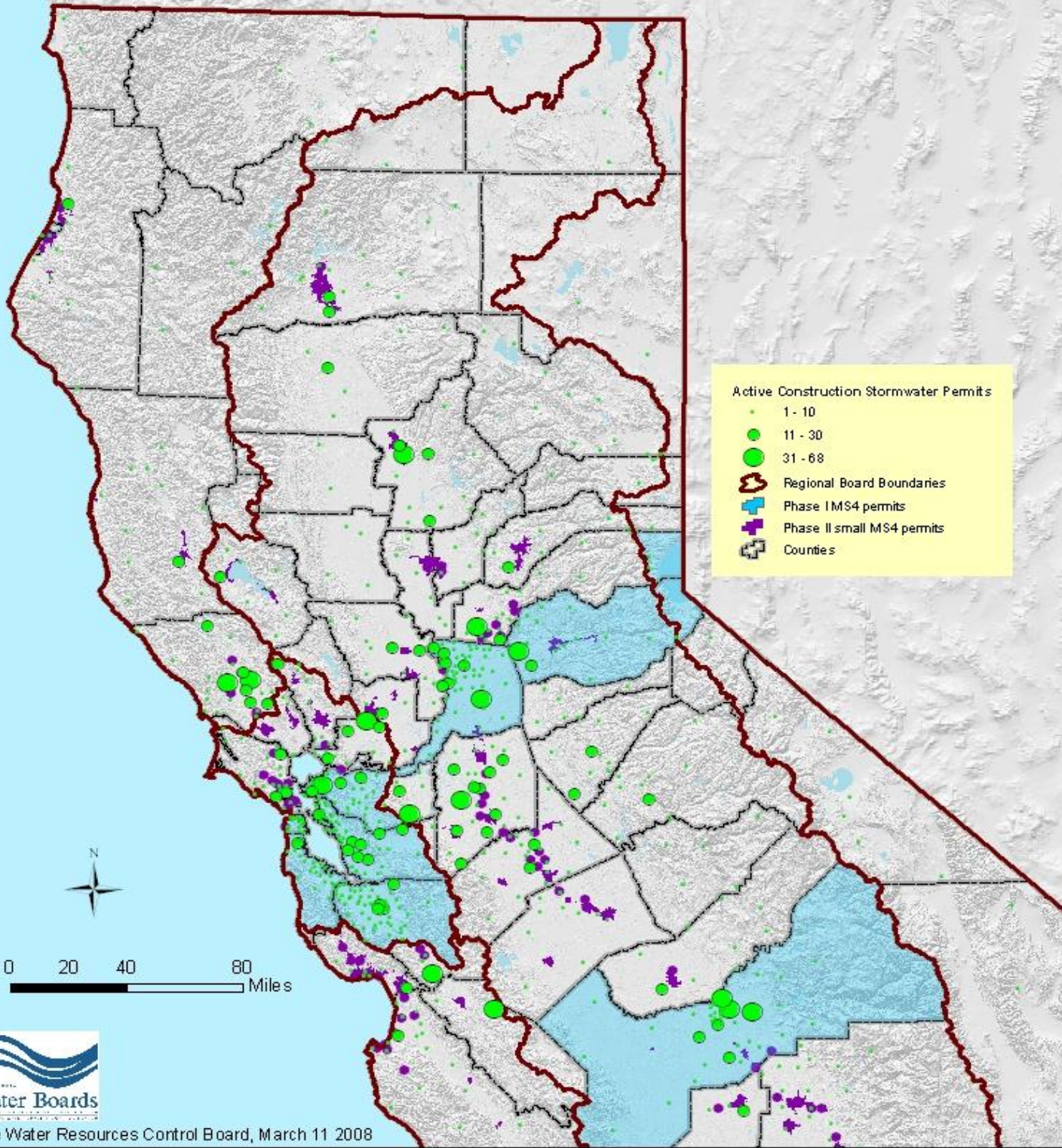


0 15 30 60 Miles

- Active Construction Stormwater Permits
 - 1 - 10
 - 11 - 30
 - 31 - 68
- Regional Board Boundaries
- Phase I MS4 permit
- Phase II small MS4 permit
- Counties



Stormwater Permit Coverage for Northern California



• CWA - Dredge and Fill Discharges

- Section 404/401 - regulate the direct discharges of dredge and fill material to US Waters
- US Army Corps issues 404 permit, which triggers the State's "401 Certification" (that the project complies with our standards)
- "401 Certifications" are one-time compliance tools that apply to many new developments in California, due in part to our abundance of ephemeral and intermittent streams

CWA - Total Maximum Daily Loads (TMDLs)

- If the beneficial uses are impaired, the State must adopt a TMDL that allocates pollutants to all the sources in a watershed
- TMDLs take a long time to develop and adopt

CWA - TMDLs

- They are watershed-based, but they are also pollutant (or impairment cause) specific, so they may or may not lead communities towards more sustainable approaches to Water Resource planning
- It's a Regulatory "Backstop"!

What can the Water Boards do to help implement/enforce the CWA?

- Appropriately designate, development and enforce appropriate Beneficial Uses.
- Develop effective criteria for protecting uses from pollutants and/or habitat disturbance associated with urbanization impacts.
- Get serious about identifying and protecting watershed processes (i.e., watershed protection).

Reason for Analysis

- HMP Permit requires flow control based on a low flow threshold that corresponds with critical shear stress
- *"Do field observations confirm that the HMP appropriately defines the flow rate that initiates movement of channel bed or bank materials?"*
- Three different low flow thresholds based on channel susceptibility (Bledsoe et al., 2010; Brown and Caldwell, 2011)
 - 0.1Q₂ for HIGH susceptibility
 - 0.3Q₂ for MEDIUM susceptibility
 - 0.5Q₂ for LOW susceptibility

Low Flow Thresholds (thanks Brian Haines)

County	Low Flow Threshold or Peak Flow	How developed?
Santa Clara County	0.1Q2	Limited regional field studies and un-calibrated modeling
Alameda, Contra Costa and San Mateo	0.1Q2	Based on Santa Clara precedent
Fairfield-Suisun	0.2Q2	Limited regional field studies and un-calibrated modeling
LA County (interim)	Match Q2	Not developed yet
San Bernardino	Match Q1, Q2, Q5	Not developed yet
Ventura	Qcrit	Not developed yet
San Diego	0.1-0.5Q2	Sensitivity analysis based on modeling different channel types
South Orange	0.1Q2 (default)	Based on Bay Area precedent?
Sacramento	0.25Q2, 0.45Q2	Soil tests, shear
Santa Ana (Riverside)	Variable	Shear ratio

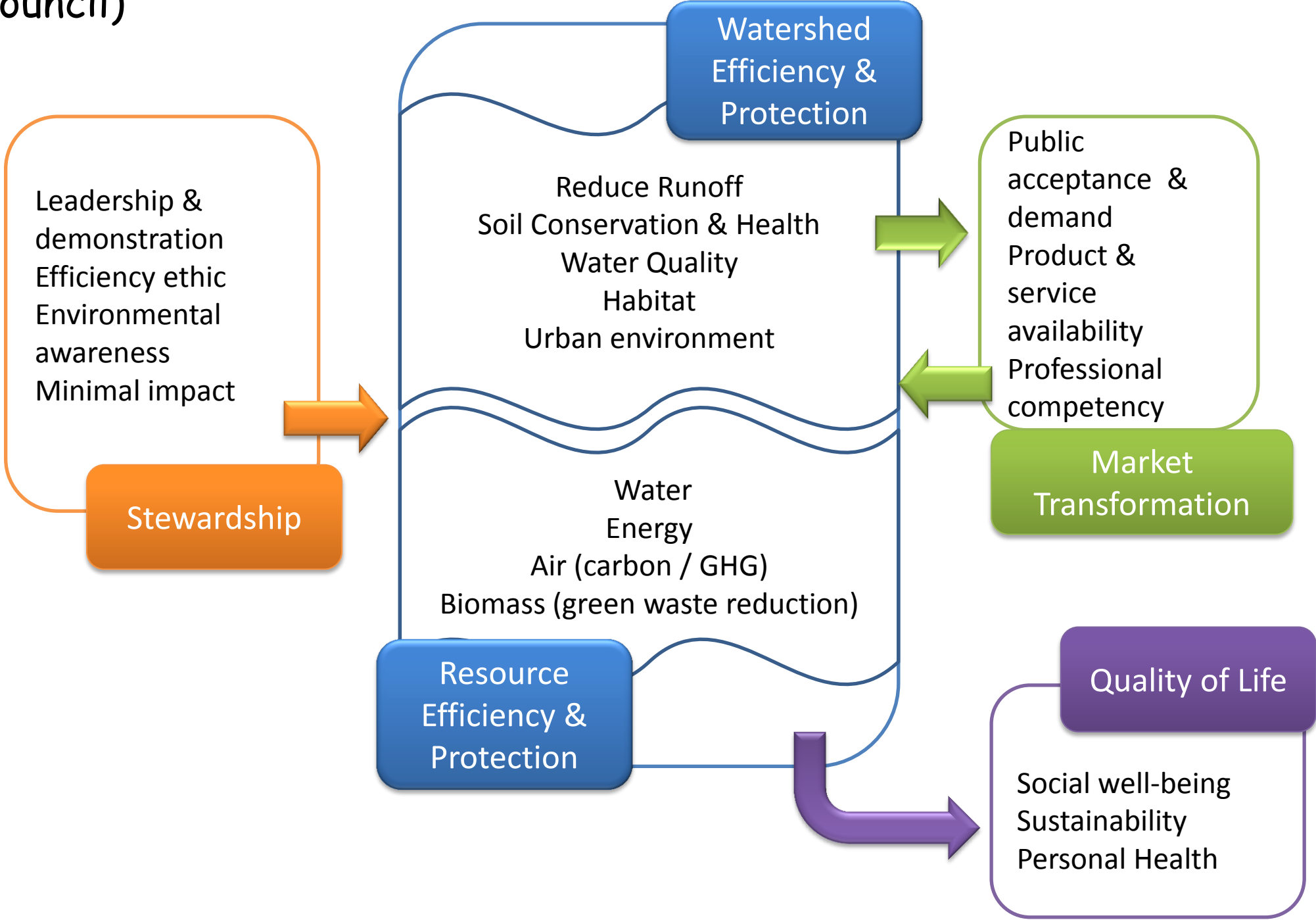
Analytical Approach

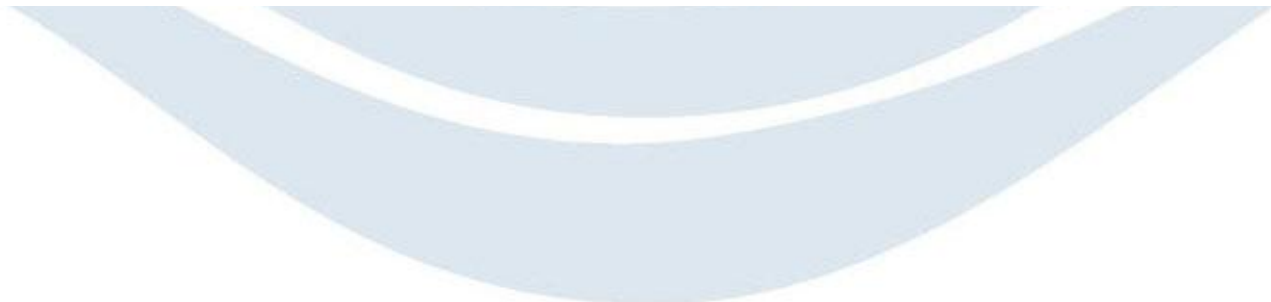
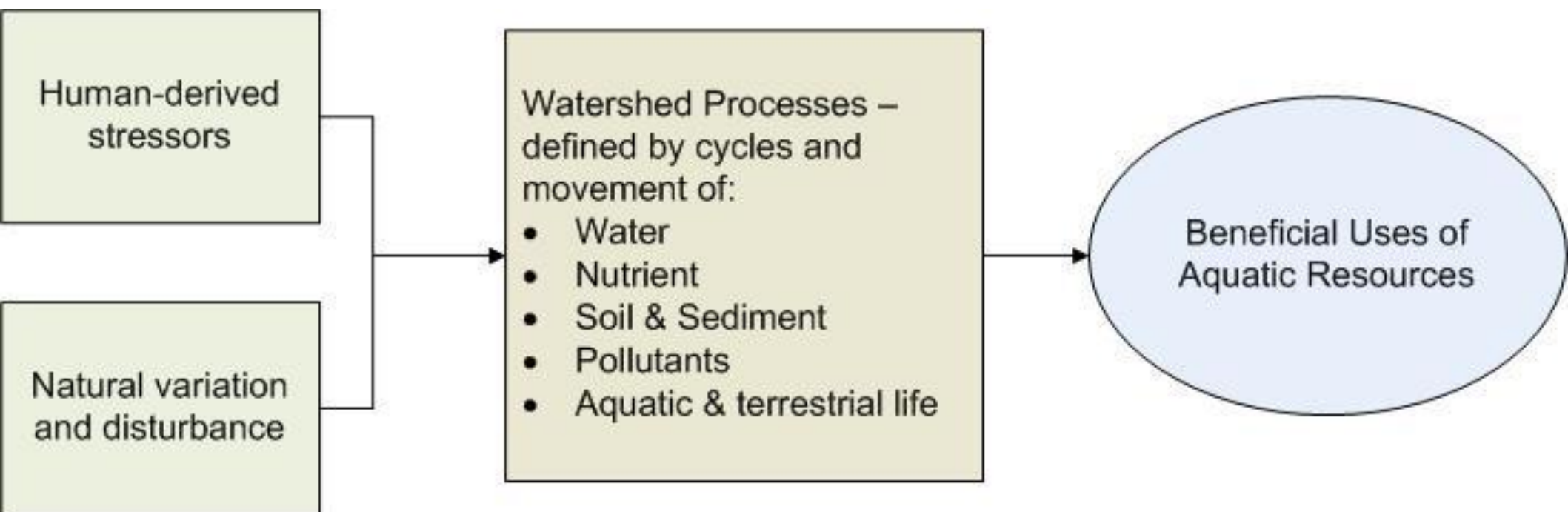
- STEP 1: Define the 2-year discharge
 - No gauge data = need to estimate
 - Phase 1 - regional regression equations
 - Phase 2 - continuous simulation modeling
- STEP 2: Develop transport rating curves
 - Site specific analysis, flow and sediment
 - Compare measured threshold to estimated 2-year discharge
 - How do observed transport thresholds compare with the range of flow thresholds in the HMP?
Do we need to adapt or modify in future?

State Water Board's Watershed Management Initiative (1996)

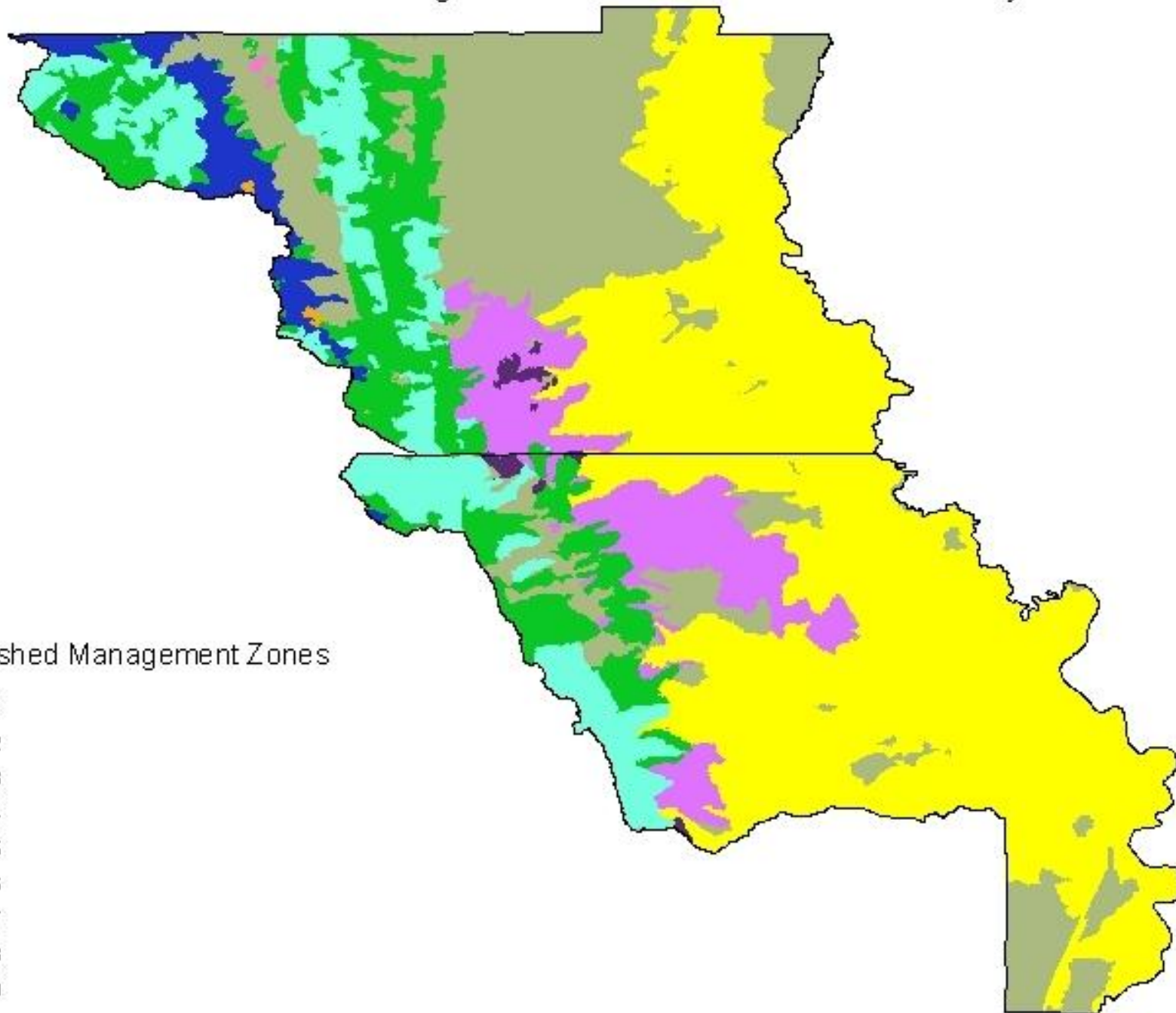
"water quality and ecosystem problems are best prioritized, addressed, and solved at the local watershed level rather than at the individual discharger, waterbody, or state agency level....."

Watershed Approach (CA Urban Water Conservation Council)





Watershed Management Zones for Colusa and Yolo County



Watershed Management Zones

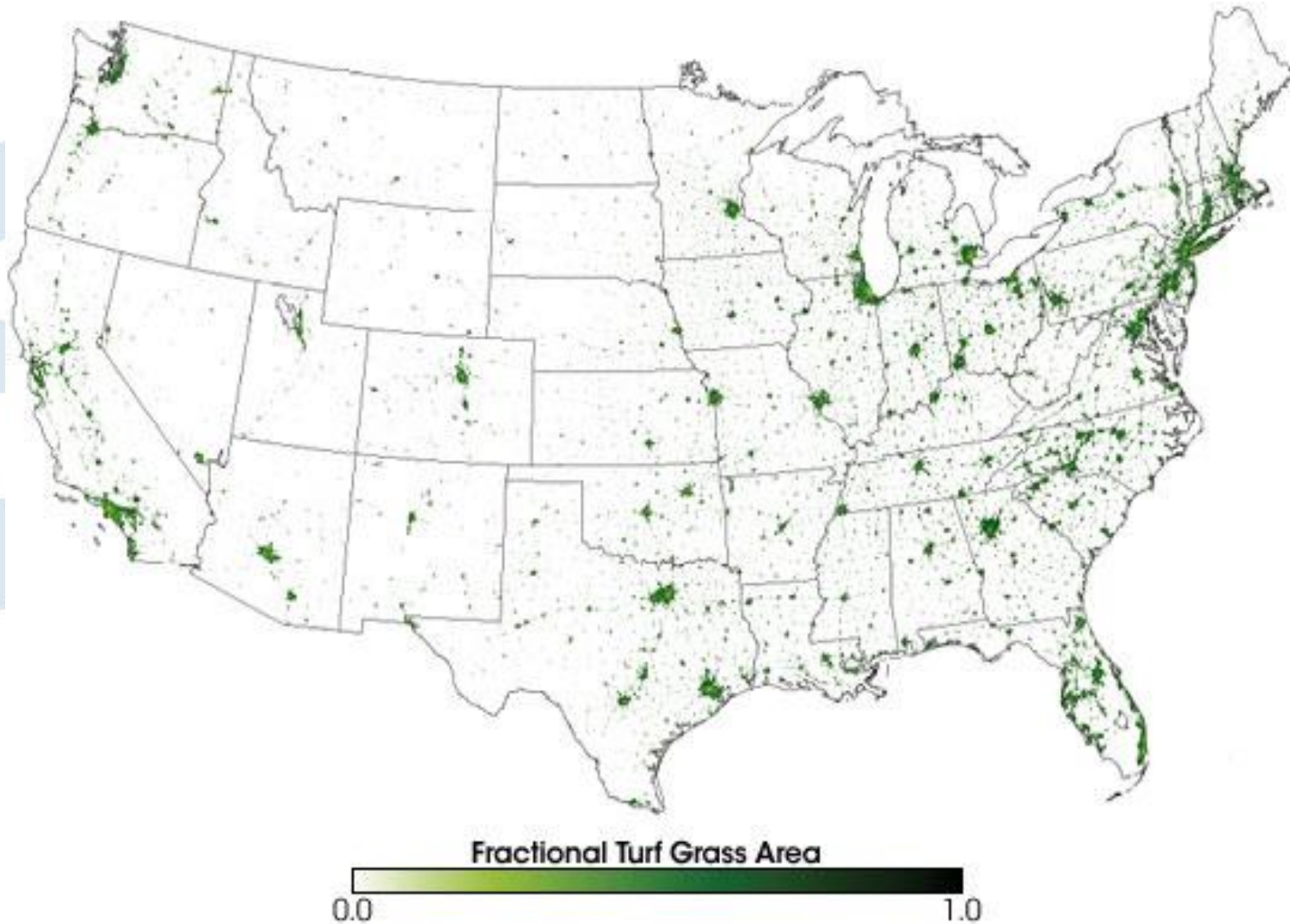
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9



Implementation Measures to protect Watershed Processes

- Vegetation and Soil Enhancement
- Riparian Buffers/Setbacks
- Low Impact Development

Lawn is the largest irrigated "crop" in the US



From NOAA

We tend to overwater our landscapes

- Stresses plants-makes them more prone to disease/infestations
- We usually break out the heavy artillery (herbicides/pesticides)

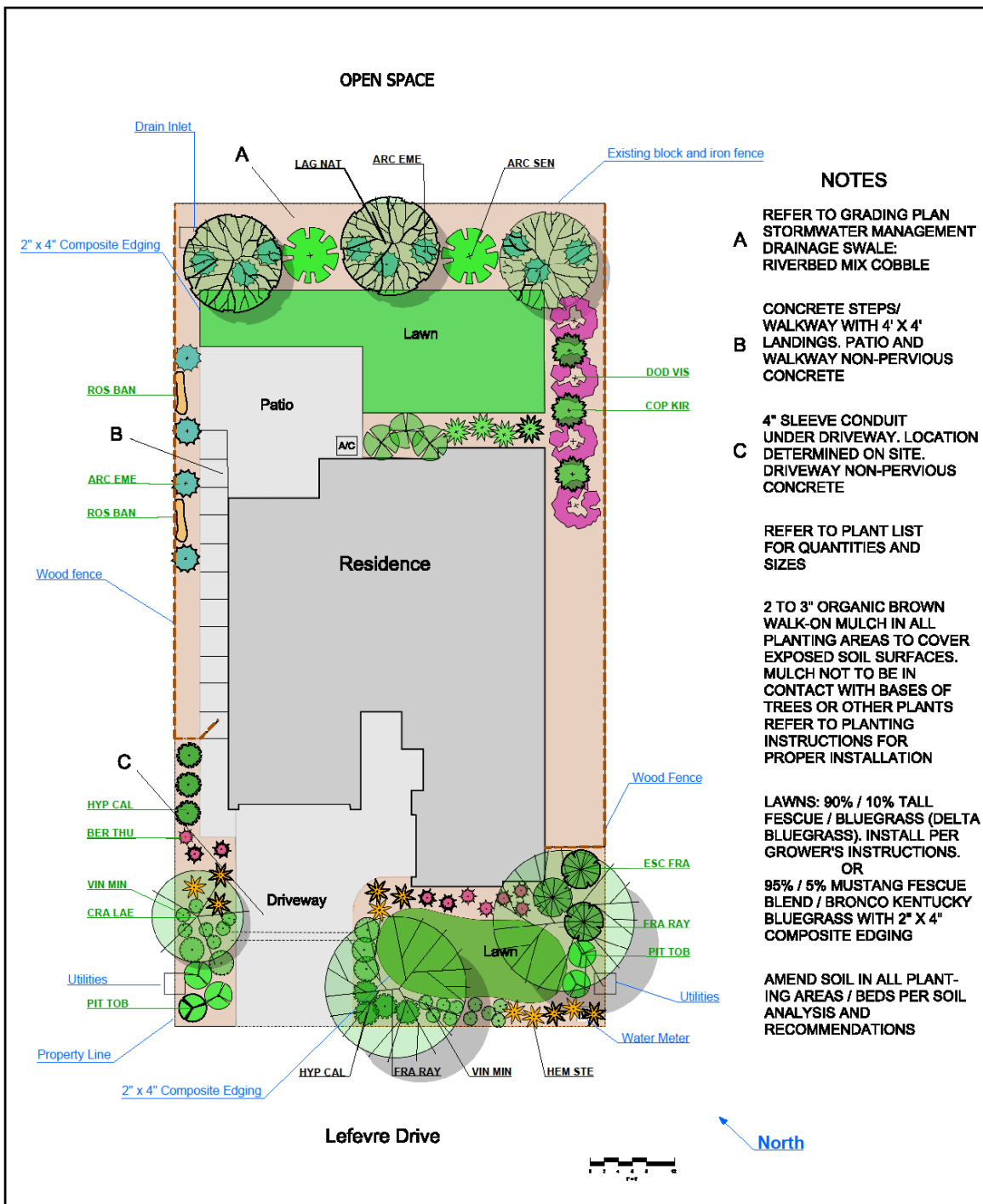
DEADLY HOTSPOTS

Death comes to us all in the end but how you'll go is anyone's guess.

We've gathered the global evidence to discover where you're most likely to die of what. Think of it as a commemoration of mortality, in true Mexican Day of the Dead style.



All figures from 21st century sources, majority of data for 2008, including World Health Organisation, Nation Master, UN and others. Very low absolute figures (2 or fewer deaths per country per year) were disregarded. Heart disease covers all cardiovascular diseases and stroke. *No-one has been killed by a meteor yet, but Antarctica has 15 times more strikes than anywhere else (so if you're going to be killed by an interstellar projectile...)



NOTES

A REFER TO GRADING PLAN
STORMWATER MANAGEMENT
DRAINAGE SWALE:
RIVERBED MIX COBBLE

B CONCRETE STEPS/
WALKWAY WITH 4' X 4'
LANDINGS. PATIO AND
WALKWAY NON-PERVIOUS
CONCRETE

C 4" SLEEVE CONDUIT
UNDER DRIVEWAY. LOCATION
DETERMINED ON SITE.
DRIVEWAY NON-PERVIOUS
CONCRETE

REFER TO PLANT LIST
FOR QUANTITIES AND
SIZES

2 TO 3" ORGANIC BROWN
WALK-ON MULCH IN ALL
PLANTING AREAS TO COVER
EXPOSED SOIL SURFACES.
MULCH NOT TO BE IN
CONTACT WITH BASES OF
TREES OR OTHER PLANTS
REFER TO PLANTING
INSTRUCTIONS FOR
PROPER INSTALLATION

LAWNS: 90% / 10% TALL
FESCUE / BLUEGRASS (DELTA
BLUEGRASS). INSTALL PER
GROWER'S INSTRUCTIONS.
OR
95% / 5% MUSTANG FESCUE
BLEND / BRONCO KENTUCKY
BLUEGRASS WITH 2" X 4"
COMPOSITE EDGING

AMEND SOIL IN ALL PLANT-
ING AREAS / BEDS PER SOIL
ANALYSIS AND
RECOMMENDATIONS

DATE:	JUNE 27, 2010
JOB NUMBER:	1
DRAWN BY:	Cheryl Buckwalter
CHECKED BY:	OB
SCALE:	1/8" = 1' @ 0 ft.
SHEET:	1 of 2

REVISION:
Rev. 3

PROJECT:
Rita - Lot 23 - Lefevre Drive
Empire Ranch Village 35
Folsom, CA

SHEET DESCRIPTION:
Conceptual Landscape Plan
For:
Elliott Homes

Landscape Liaison
P.O. Box 218
Cool, CA 95814

MetroList®











Eric Berntsen
916-341-5911
eberntsen@waterboards.ca.gov