Revision of the Lake Elsinore & Canyon Lake Nutrient TMDL

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Economic Considerations Regional Project Cost Sharing

February 14, 2018

Lake Elsinore/Canyon Lake Task Force Meeting

RISK SCIENCES

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Presentation Outline

- Economic Analysis
- Regional Project Cost Sharing

Economic Considerations

Approximate Costs - Important Caveats

- Cost estimates are planning level
- Cost is expressed as collective amounts with no discussion of distribution between individual stakeholders
- Some projects serve multiple functions and may be wholly or partially implemented regardless of TMDL

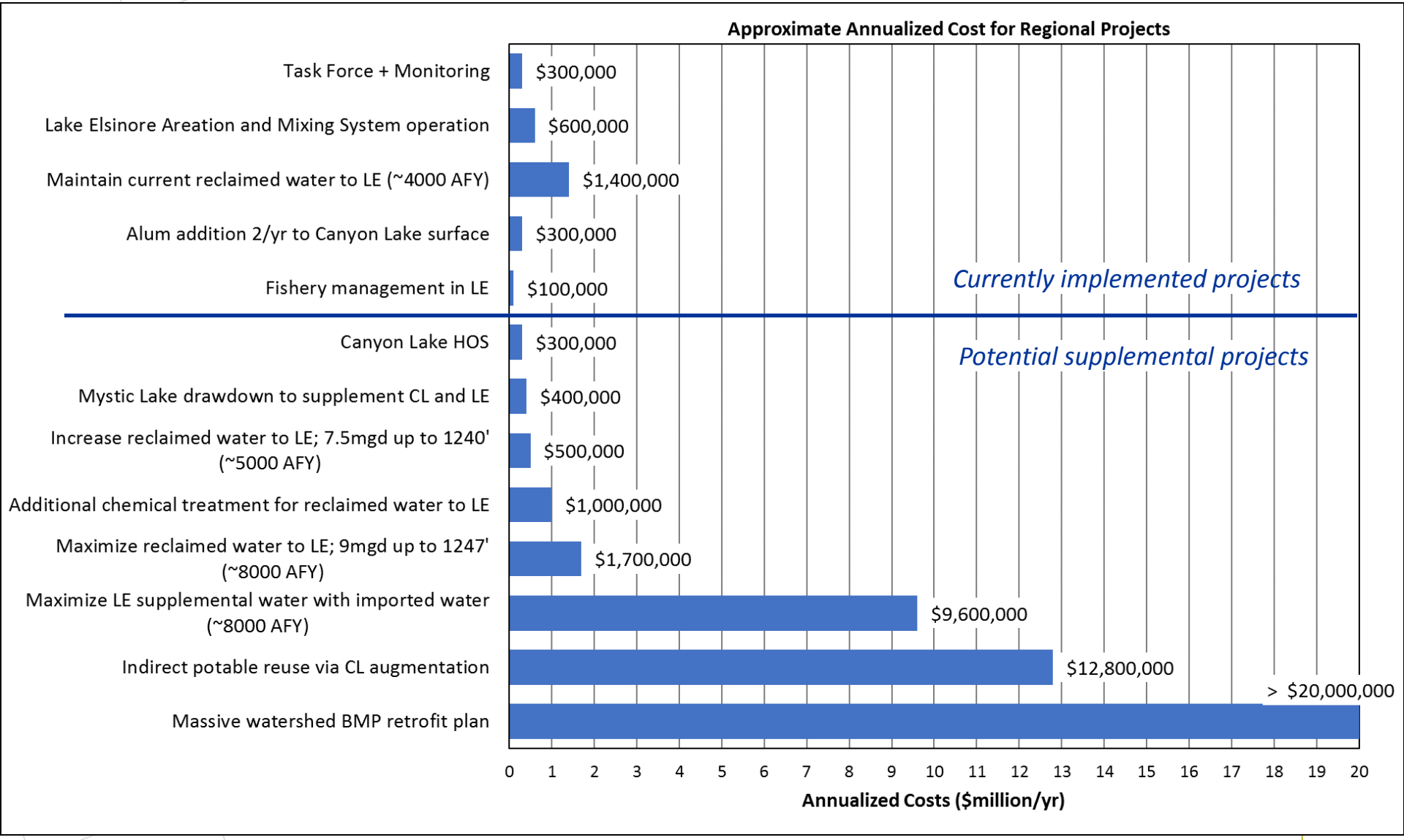
Approximate Costs - Important Caveats

- TMDL compliance will require continued implementation of current, or equivalent, level of control
- TMDL revision estimation of supplemental project cost is for consideration of whether economically feasible paths to compliance exist
- Which, and how many, project(s) to be evaluated in stakeholder BMP plans

Basis of Cost Estimates

- Actual costs used for currently implemented projects
- Cost of reclaimed water addition at $350/AF
- Cost of imported water at $1200/AF
- Prior facility plans for LE/CL projects (scaled to 2018 by ENR)
  - Canyon Lake HOS (Pace, 2011)
  - EVMWD Indirect Potable Reuse (IPR) (Kennedy Jenks, 2017)
- Costs approximated from industry standards
  - Increased P removal (~0.1 mg/L) in WWTP effluent
  - Stormwater BMP retrofits (Jason Uhley, LESJWA Summit, 2011)
- Annualized capital with assumed debt payback at 5 percent interest over 20 year lifespan

Regional Projects

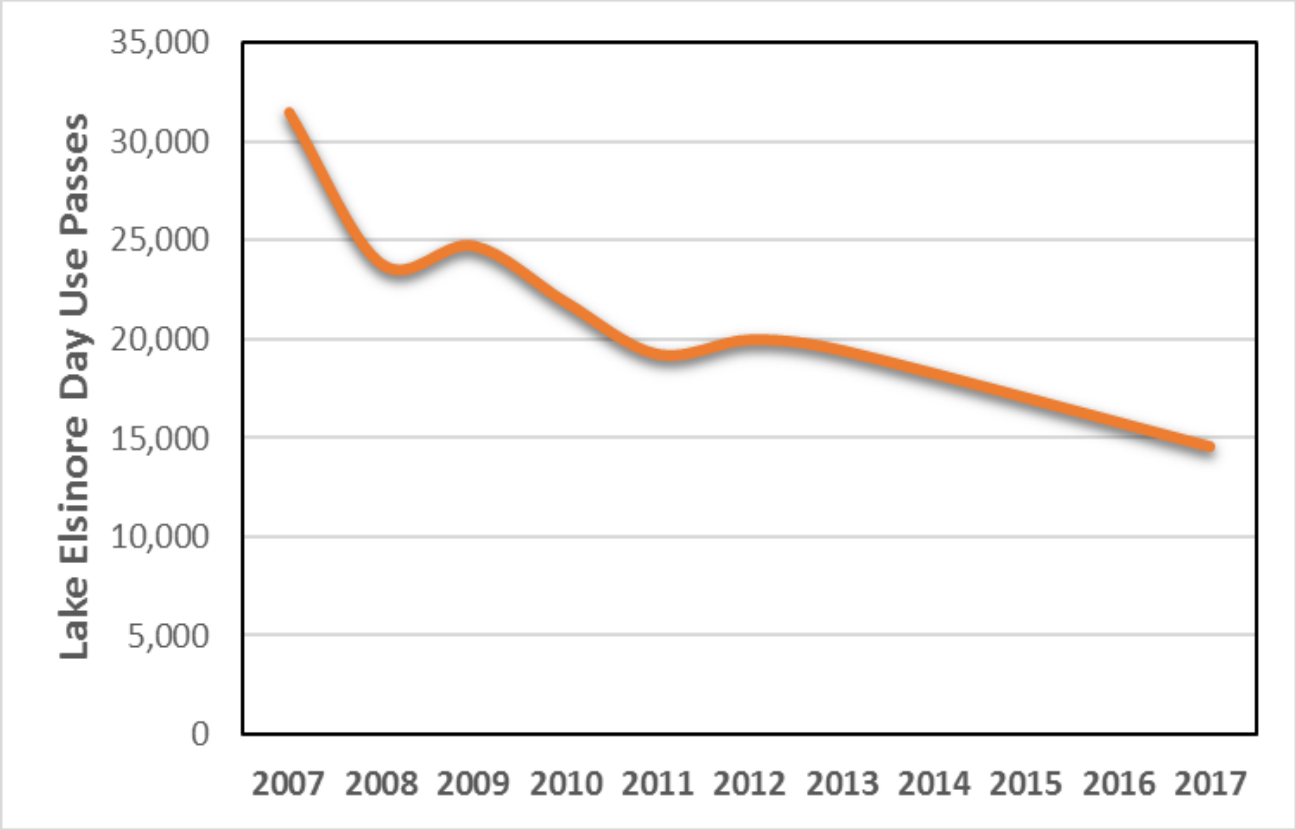


Economic Considerations - Cost

- Substantially lower cost for treatment within lakes than watershed
- Cost to add reclaimed water is greater than sum of all other currently implemented controls
- Some projects may be more economically feasible by providing mutual benefits for water supply or hydropower (e.g. IPR, LEAPS)
- Supplemental projects that are within similar range of currently implemented projects do exist

Economic Considerations - Benefit

- Recreation (e.g., boating and fishing)
- Protection of public health
- Use fees and avoided legal costs for lake managers



Economic Considerations - Benefit

- Treatability of water supply (EVMWD's Canyon Lake WTP)
  - WTP operations
  - Lower cost of local surface water than imported sources

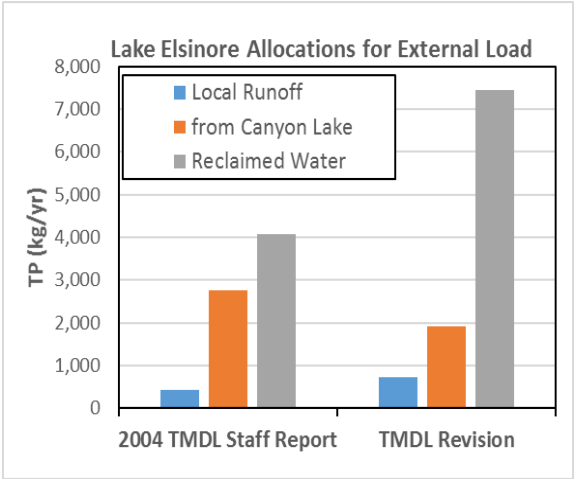
Revised Allocations

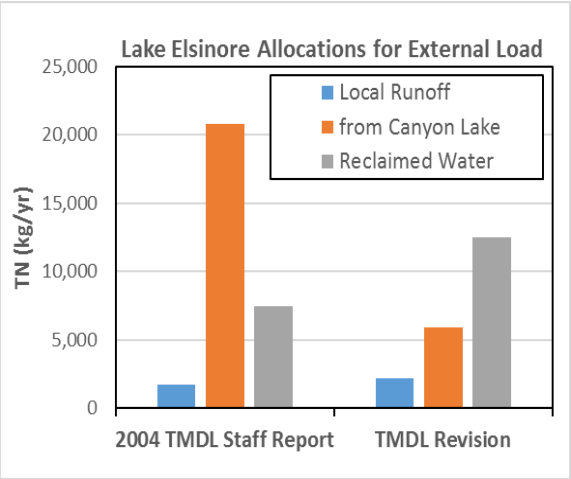
Costs for In-Lake BMPs

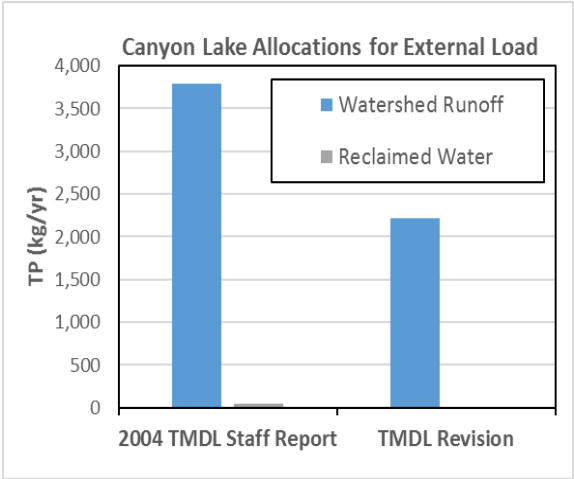
- Cost shares were updated in 2014 - total project costs divided based on relative loading
  - LSPC washoff coefficients updated with 2014 land use mapping for relative loading
  - For alum, did not estimate actual offset demand – save for TMDL revision
- New cost share estimates developed based on analysis for TMDL revision
  - Based on average hydrologic year
  - Offset Demand = 1.2 * (Existing Load – Reference Load)

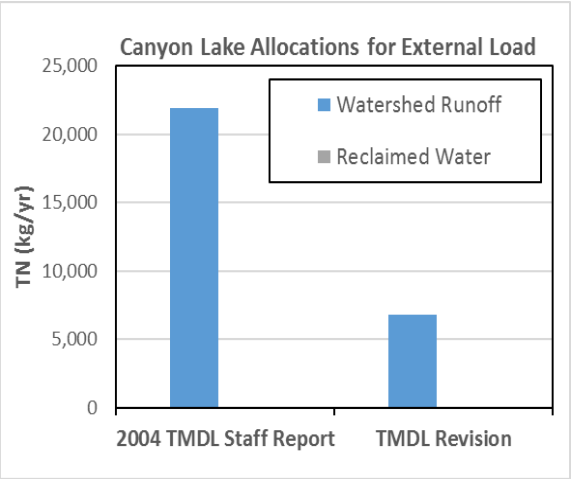
Allowable Reference External Load

- Compared with 2004 TMDL
- Increase in allowable local LE nutrients and reclaimed water
- Reduced allowable external nutrient load in Canyon Lake watershed







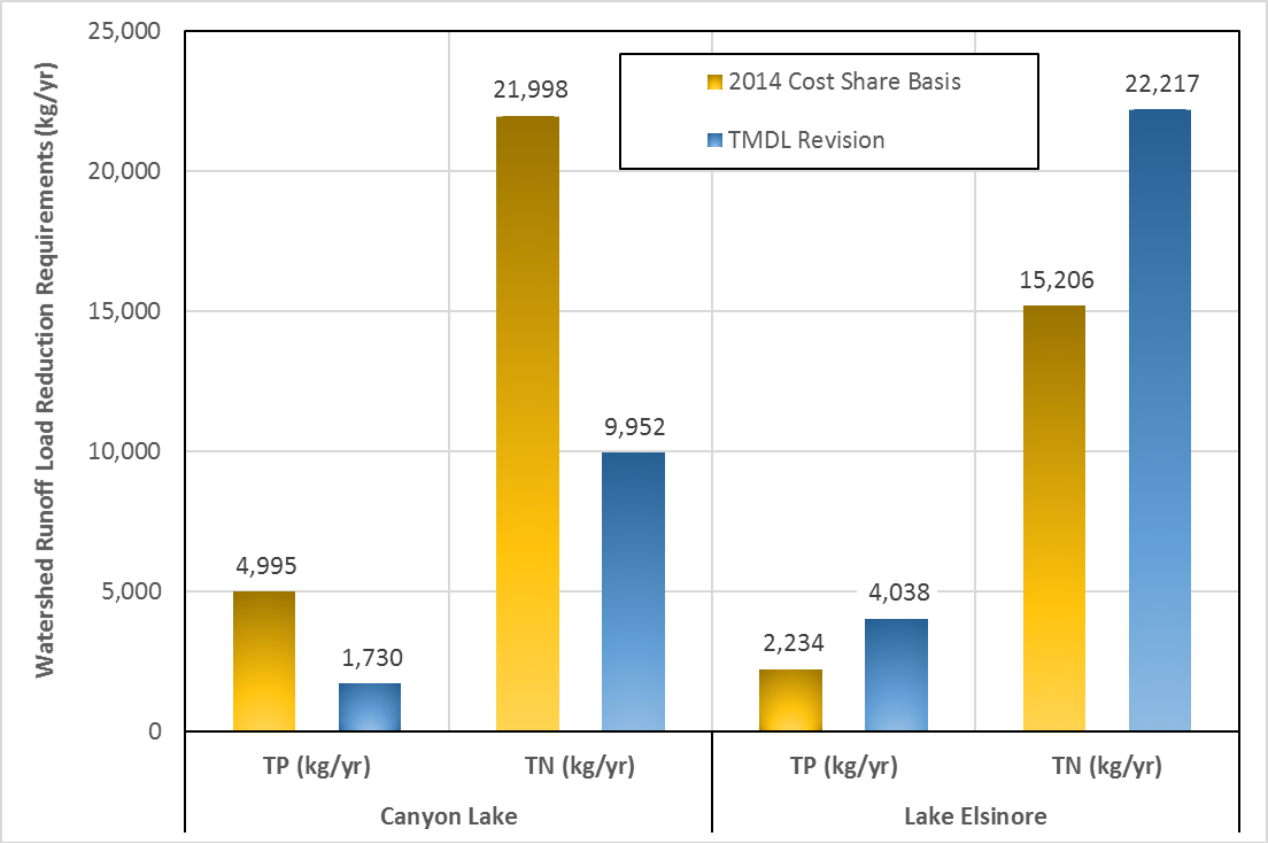


Water Year	Frequency	Overflow (AFY) Canyon Lake to Lake Elsinore	
		Estimated (EFDC)	USGS Gauge Data [1]
1994 (mod)	41%	2,483	2,483
1998 (wet)	16%	133,981	17,230
2000 (dry)	43%	0	69
Frequency-weighted Average		22,520	3,948

1) Includes a small (<1 mi²) drainage area downstream of Railroad Canyon Dam

New Load Reduction Estimates

- Load reduction to meet allocations in revised TMDL relative to 2014 cost share calculations (same land use)
- Total (CL + LE) load reduction required ~15 percent



What changed

- Increased fraction of runoff estimated to overflow to Lake Elsinore
- Annualized average overflows from Mystic Lake added based on long-term water balance analysis
- No credit for watershed BMPs prior to TMDL revision – accounted for in use of recent watershed monitoring data
- Accounting for natural attenuation via channel bottom recharge from jurisdictions further from lake inflows

How does this impact project budgets

- Shifts required load reduction; increasing in LE and decreasing in CL
  - Current alum project meets revised TMDL load reduction requirements for TP (single nutrient)
  - LEAMS hours increases for everyone
- Partners further from lakes have a reduced relative loading and thereby offset demand
- Jurisdictions upstream of Mystic Lake need to offset nutrient loads to Lake Elsinore

Costs for In-Lake BMPs

- Alum addition in Canyon Lake – average year
  - 2000 kg/yr TP offset demand * 150 kg dry alum per kg TP removal = 300,000 kg/yr alum addition (~current program)
- LEAMS operation in Lake Elsinore
  - 4800 kg/yr TP demand offset / 3.5 kg TP/hr LEAMS = 1370 hours
  - 26700 kg/yr TN demand offset / 22 kg TN/hr LEAMS = 1210 hours
  - 2018 Offset demonstration findings could influence credit calculation
- Fishery management activities will accrue additional credits for Task Force

Compliance Demonstration with In-Lake Offsets

- Model results for average hydrologic year used to prevent large year to year fluctuations in offset demand
- In future, watershed data provides information for load reduction requirement
  - Guidance provided in new Chapter 9

Step 1. Compile 10 years of wet weather composite sample concentrations

Year	Storm 1 TP (mg/L)	Storm 2 TP (mg/L)	Storm 3 TP (mg/L)	Storm 1 TN (mg/L)	Storm 2 TN (mg/L)	Storm 3 TN (mg/L)
Year 1	0.47	0.71	0.41	2.80	2.40	1.73
Year 2	0.40	0.63	0.53	3.20	3.10	2.45
Year 3	0.38	0.52	1.10	5.00	2.90	2.14
Year 4	0.36	0.64	0.52	5.10	3.50	2.64
Year 5	0.30	0.34	0.34	2.90	4.57	4.08
Year 6	0.31	0.41	0.31	2.20	4.92	3.69
Year 7	0.53	0.44	2.88 *	2.00	2.91	6.02 *
Year 8	0.49	0.57	0.40	1.60	3.16	1.48
Year 9	0.62	0.73	0.41	1.76	1.58	1.63
Year 10	0.88	0.52	0.52	4.20	1.71	1.83

Step 2. Compute 10-yr Average Nutrient Concentration in Runoff	TP (mg/L)	TN (mg/L)
	0.51	2.87

*Sample removed from average calculation because of influence of burned hillside erosion (TSS = 3163 mg/L)

Step 3. Compute 10-yr Average Annual Runoff from Co-located Gauge (AF/yr):	1800

Step 4. Compute Nutrient Loads in Runoff (Step 2 * Step 3)	TP (kg/yr)	TN (kg/yr)
	1,132	6,369

Step 5. Compute Allowable Nutrient Load (Step 3 * Ref Conc)	TP (kg/yr)	TN (kg/yr)
	711	2,043

Step 6. Compute Nutrient Offset	TP (kg/yr)	TN (kg/yr)
Excess nutrient loads (Step 4 - Step 5)	422	4,326
Safety factor	1.20	1.20
Offset to be demonstrated with in-lake BMPs	506	5,191

Step 7. Independent In-lake BMP Offset Effectiveness Demonstration:	**506 kg/yr TP**	**Compliance √ - TP only**