Update to Lake Elsinore and Canyon Lake Nutrient TMDL Task Force

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Outline

- Supplemental model scenario results for Lake Elsinore
- Stormwater as a resource for lake water quality
- Next steps

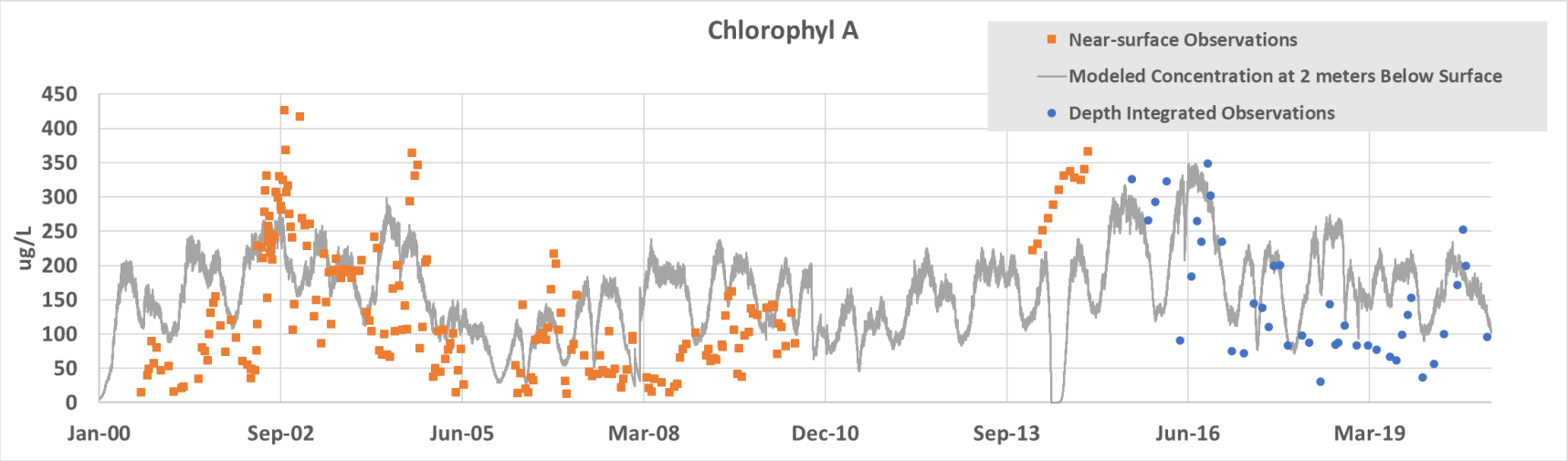
Supplemental Modeling in Lake Elsinore

- Key parameters for supplemental scenarios

Parameter	Existing Condition	Scenario 1a: Reference Conditions	Scenario 2: Alternative Reference Condition	Scenario 3: Maximized Stormwater Retention
Hypsography	With levee	Without levee	With levee	With levee
Inflow TP (mg/L) in Runoff	0.39	0.32	0.16	0.16
Inflow TN (mg/L) in Runoff	1.64	0.92	0.68	0.68
Internal TP Flux ($mg/m^2/day$)	9.0	5.4	3.7	3.7
Internal TN Flux ($mg/m^2/day$)	75.0	37.0	31.1	31.1
EVMWD discharge	Metered Inflows	None	None	None
Runoff Flow	USGS gauge + local runoff			70% of (USGS gauge + local runoff)

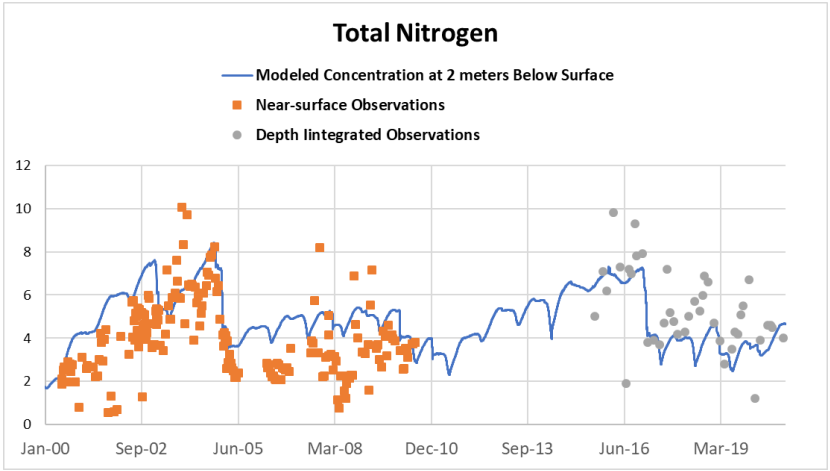
Existing Condition Results

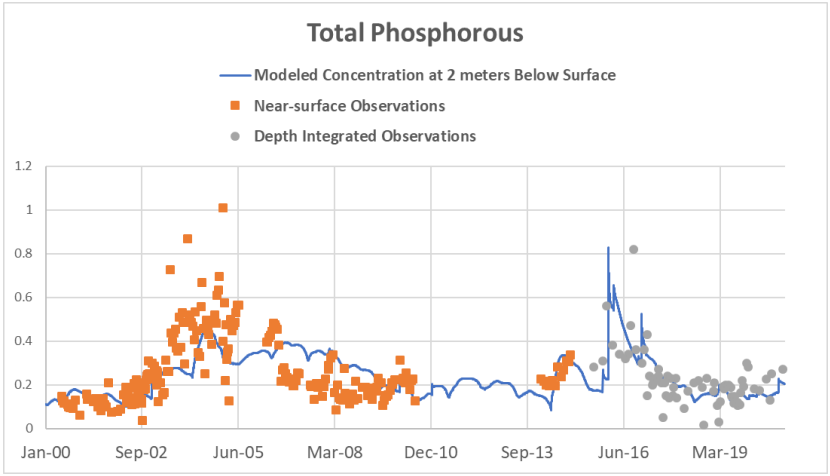
- Calibration 2000-2014
- Validation 2015-2020



Existing Condition Results

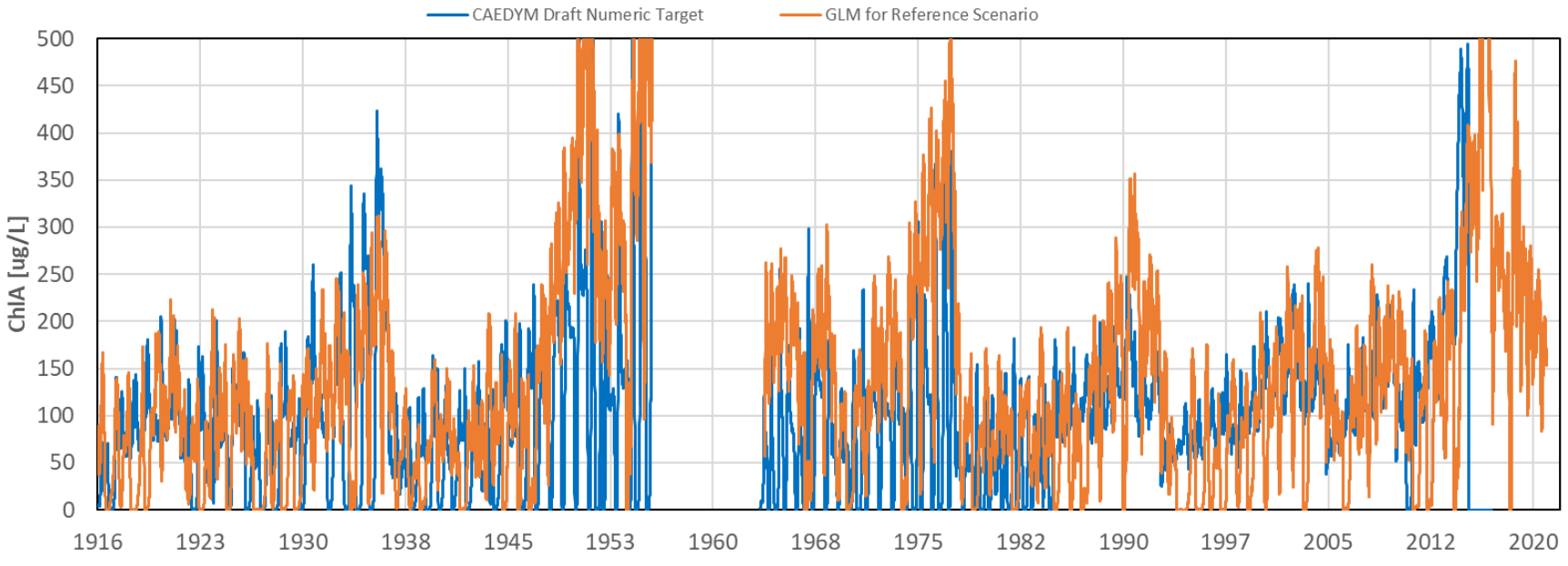
- Total nutrients includes bioavailable and non-bioavailable pools
- Sharp rises follow large storms, resuspension at low lake levels





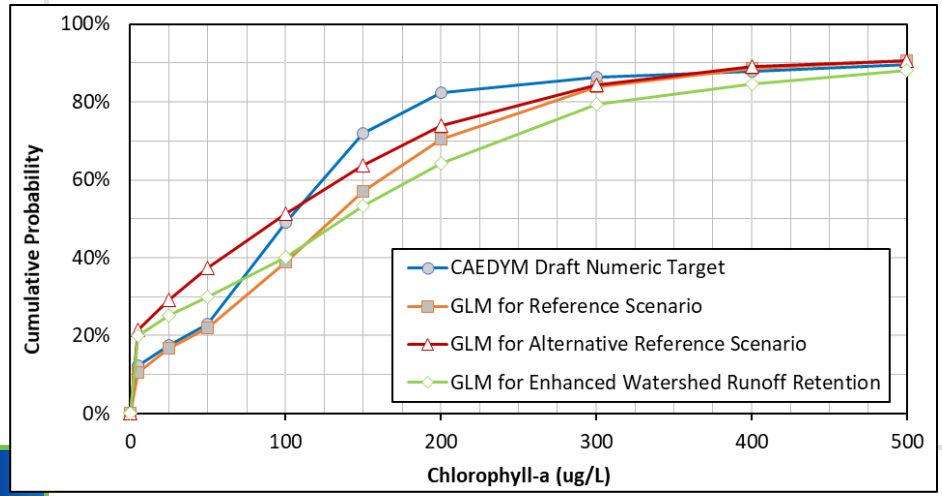
Scenario 1a: Dec 2018 Reference Condition

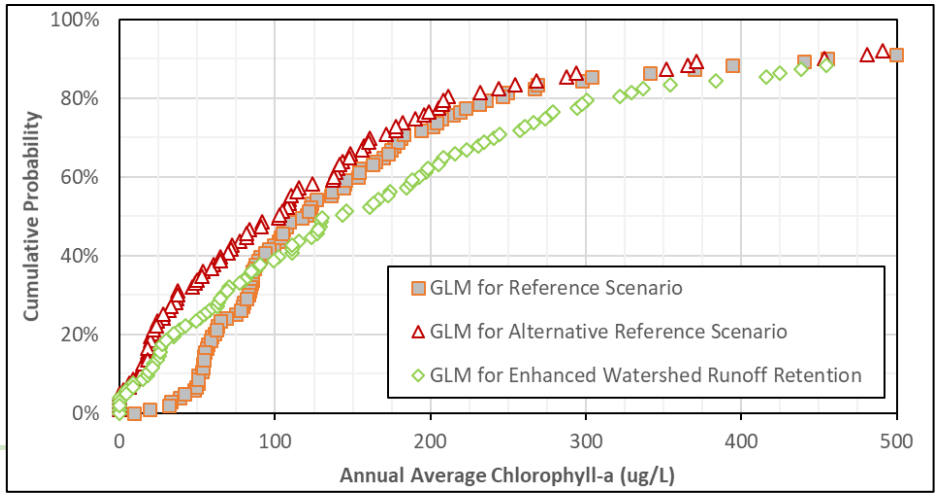
- Comparison of DYRESM-CAEDYM with GLM for reference condition employed in December 2018 draft technical report



Chlorophyll-a for all scenarios

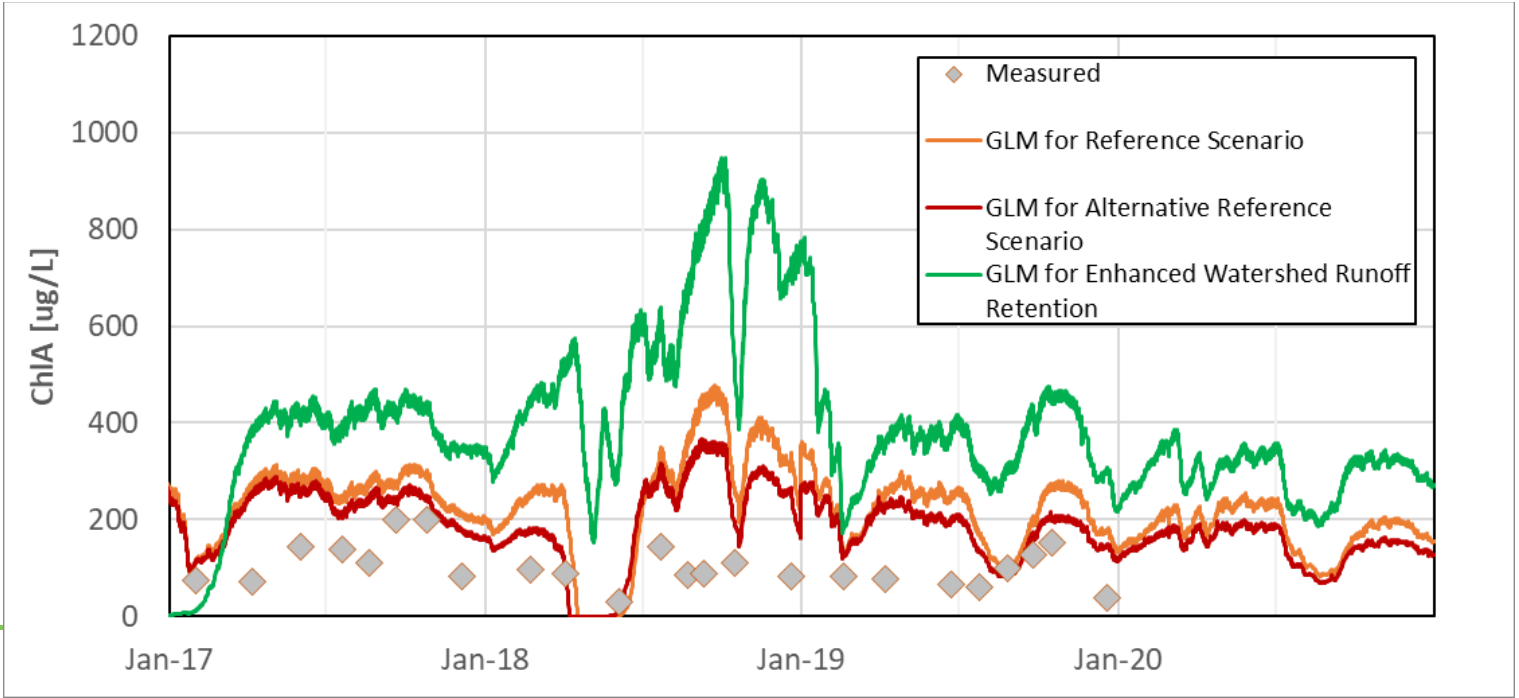
- CDFs of 100yr simulations with DYRESM-CAEDYM and GLM
- Chlorophyll-a most impacted by lake level
- Annual averages of model results may provide a simpler compliance metric





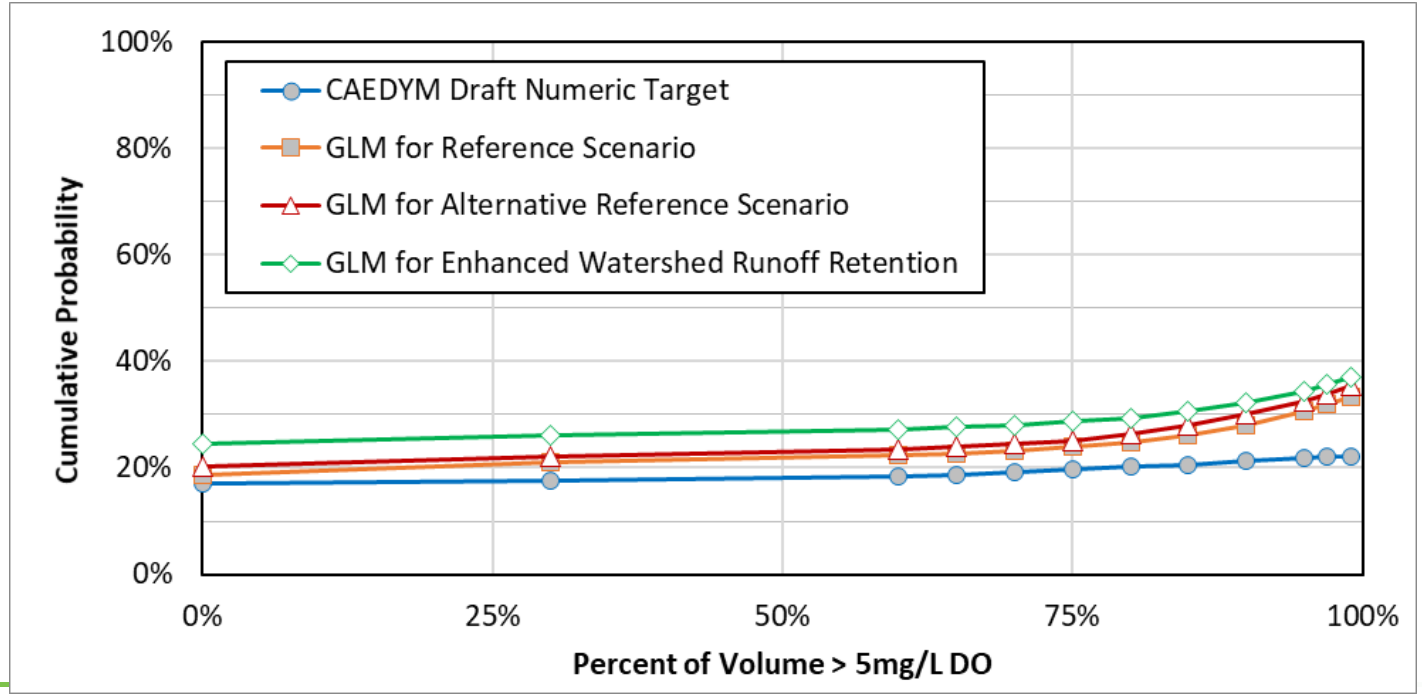
Chlorophyll-a for all scenarios

- Return of lake following reference condition desiccation event in 2015; 2014 for enhanced watershed runoff retention scenario



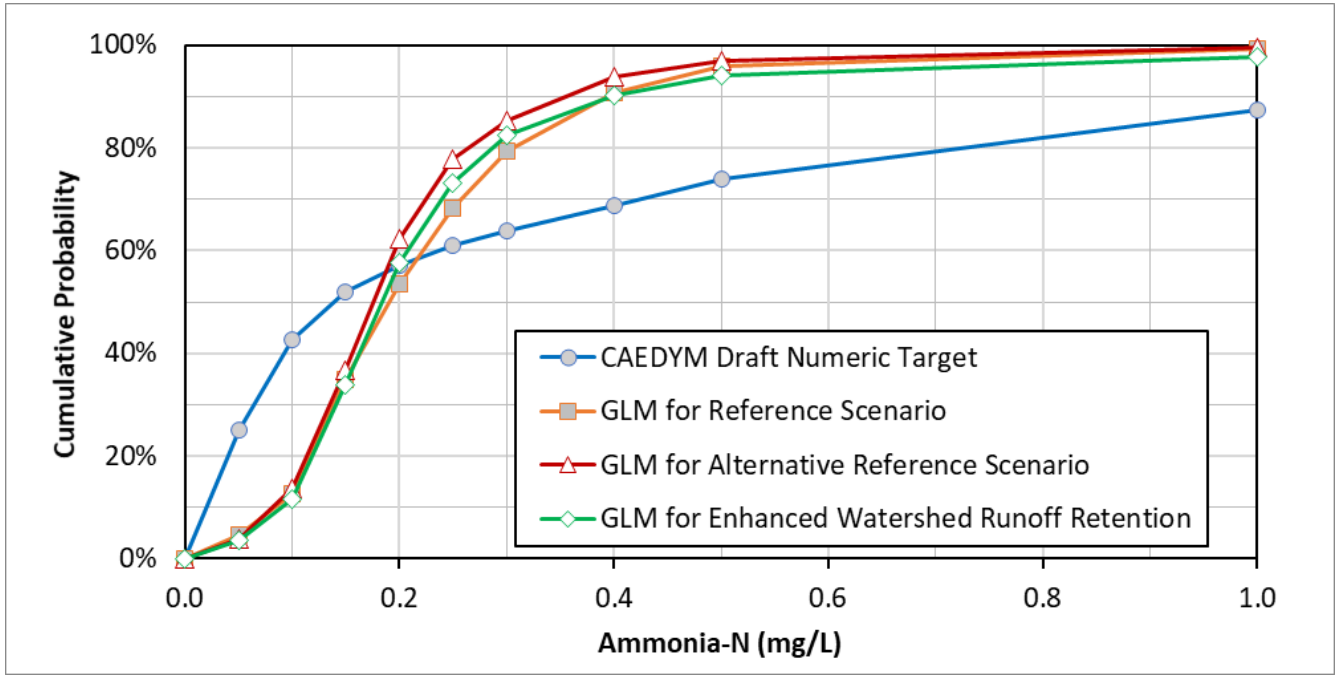
Dissolved Oxygen for all scenarios

- CDFs of 100yr simulations with DYRESM-CAEDYM and GLM



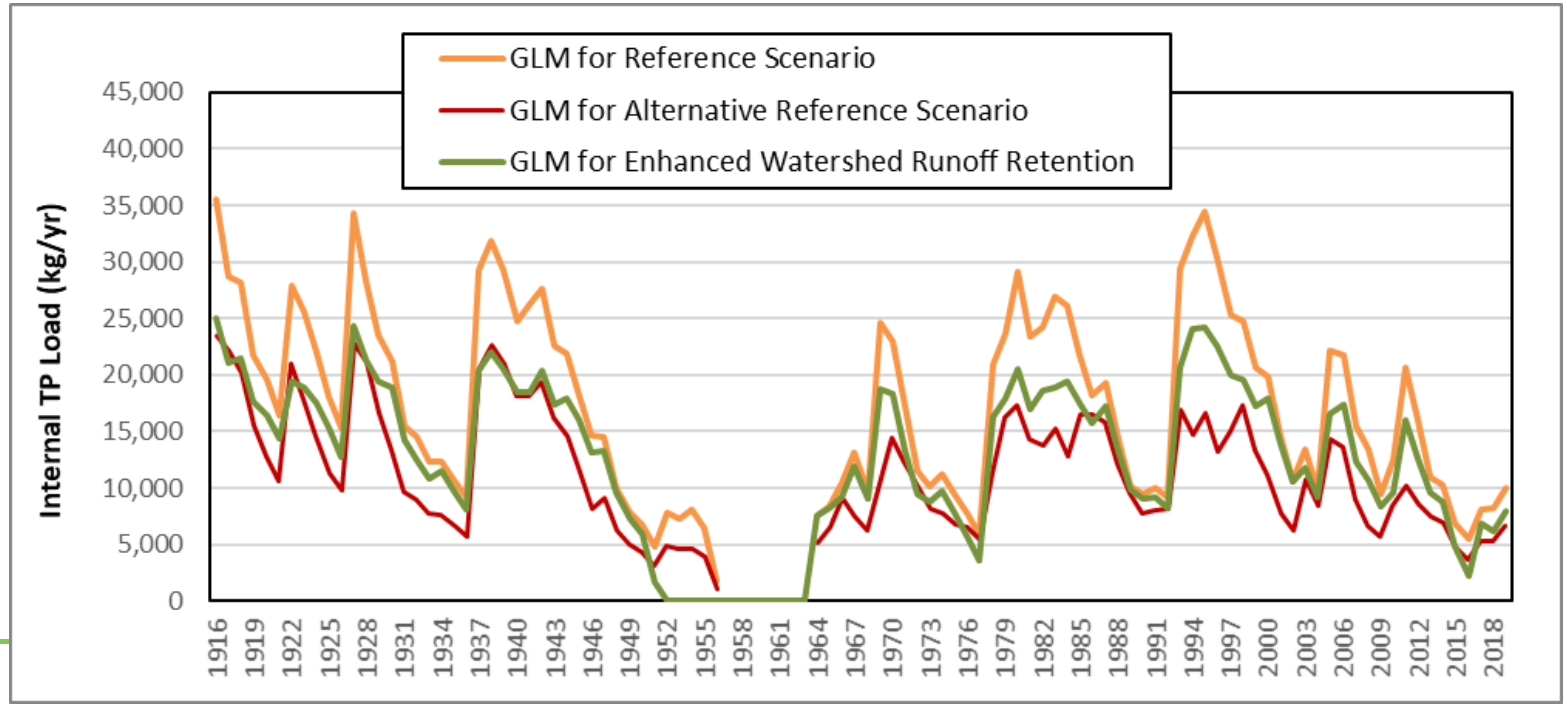
Ammonia

- CDFs for DYRESM-CAEDYM and GLM scenarios



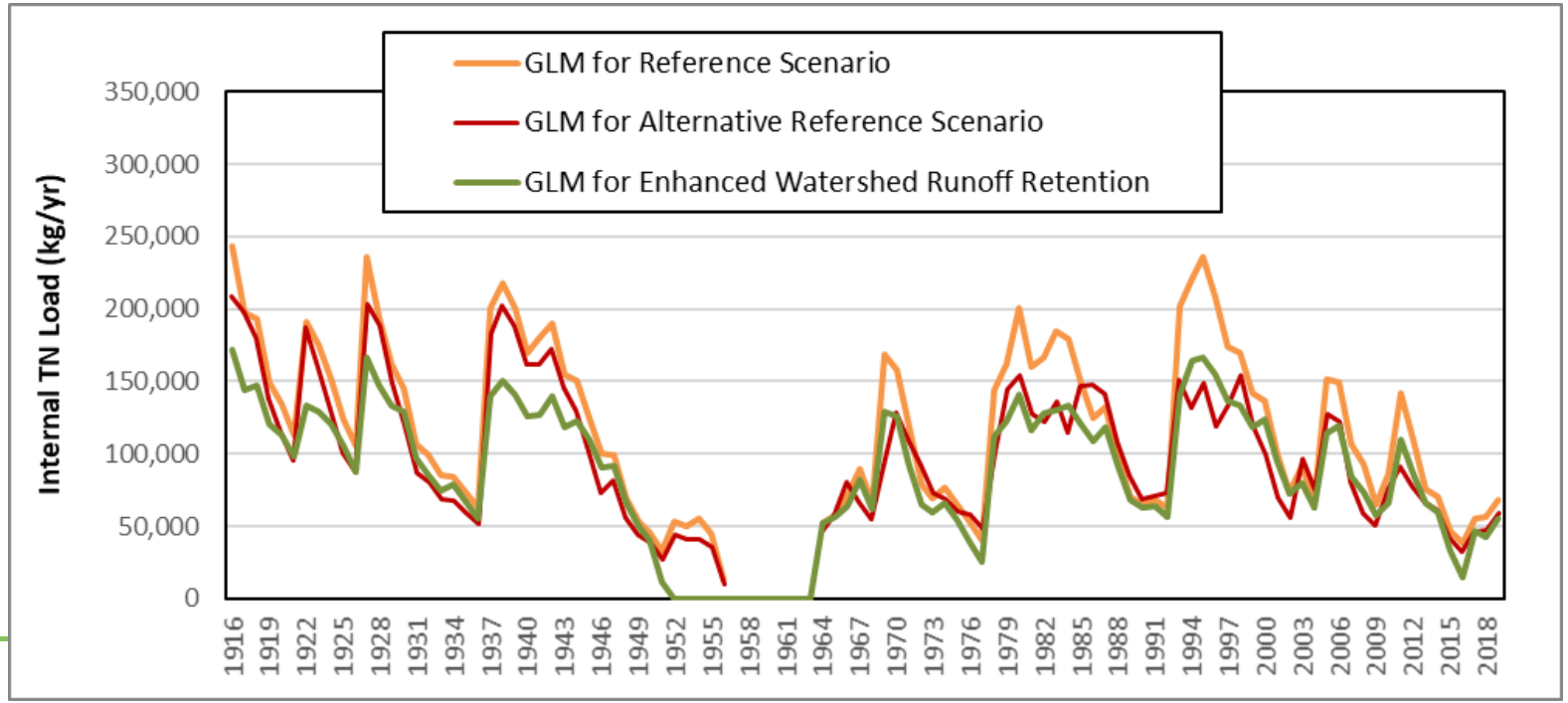
Internal TP Load from Sediment

- About half of modern estimate of 33,060 kg/yr reported in 2004 TMDL based on Anderson core-flux studies



Internal TN Load from Sediment

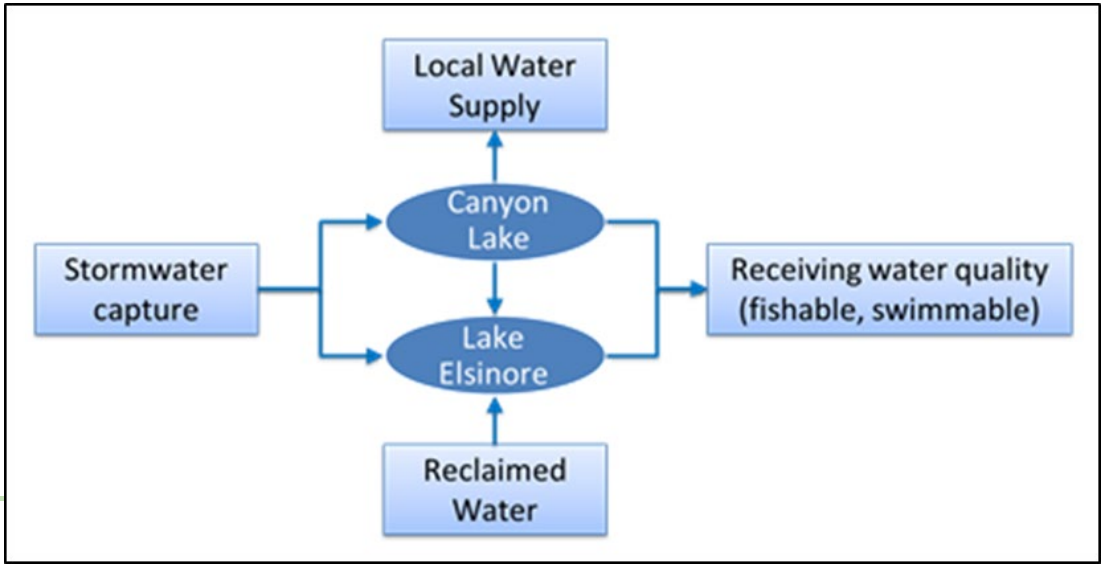
- About half of modern estimate of 197,00 kg/yr reported in 2004 TMDL based on Anderson core-flux studies



Stormwater as a Resource for Lake Elsinore

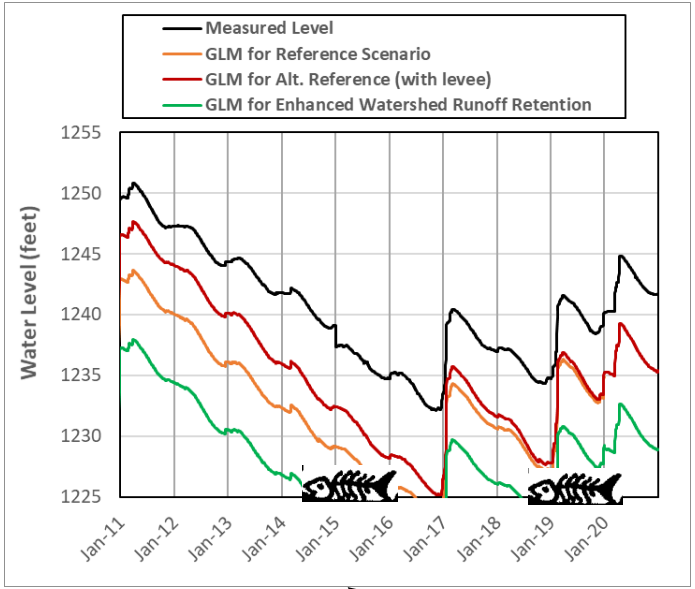
One Water Perspective for Lake Elsinore

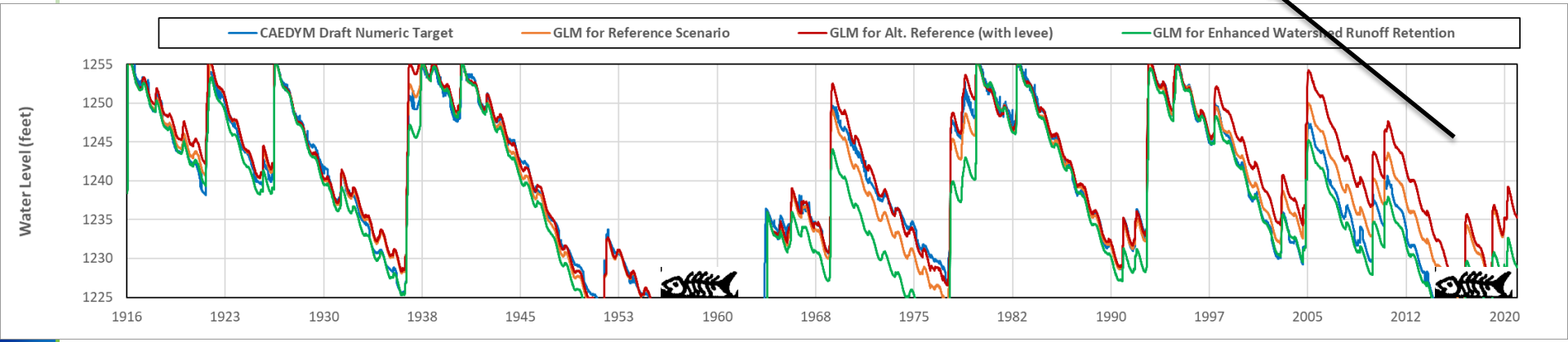
- Integrated water quality planning of multiple sources of water to maximize beneficial uses
- Concept - Stormwater provides a net benefit to Lake Elsinore water quality
- Quantitative analysis using calibrated GLM
- Implications for setting allocations and implementation



Reference Scenario Hydrology

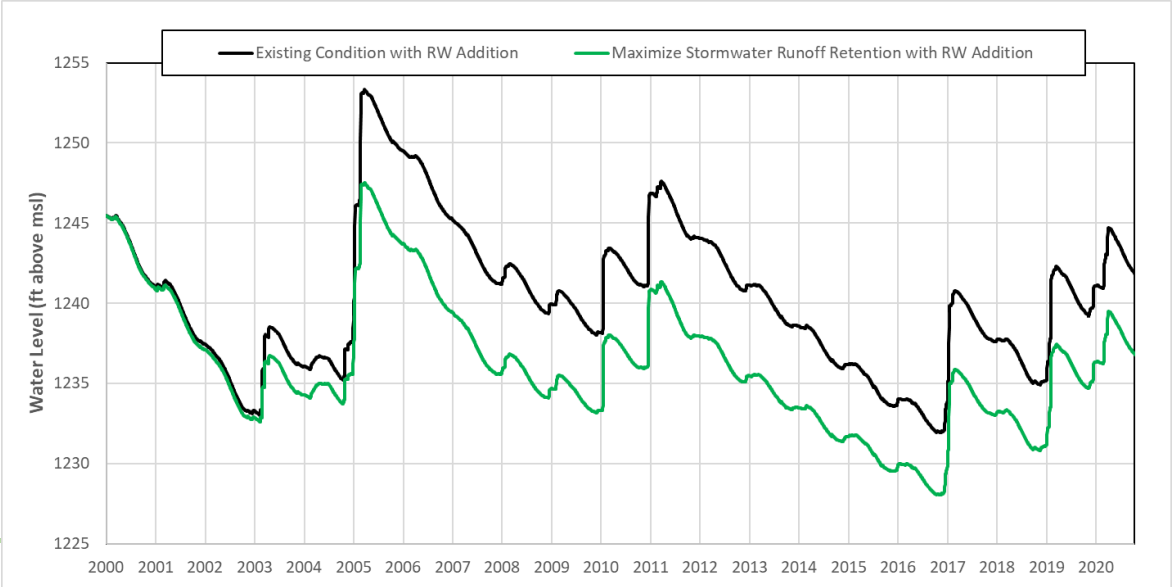
- Water level simulation for reference condition (i.e. no reclaimed water)
- With and without levee
- Measured inflows compared with 70% of measured inflows, with levee





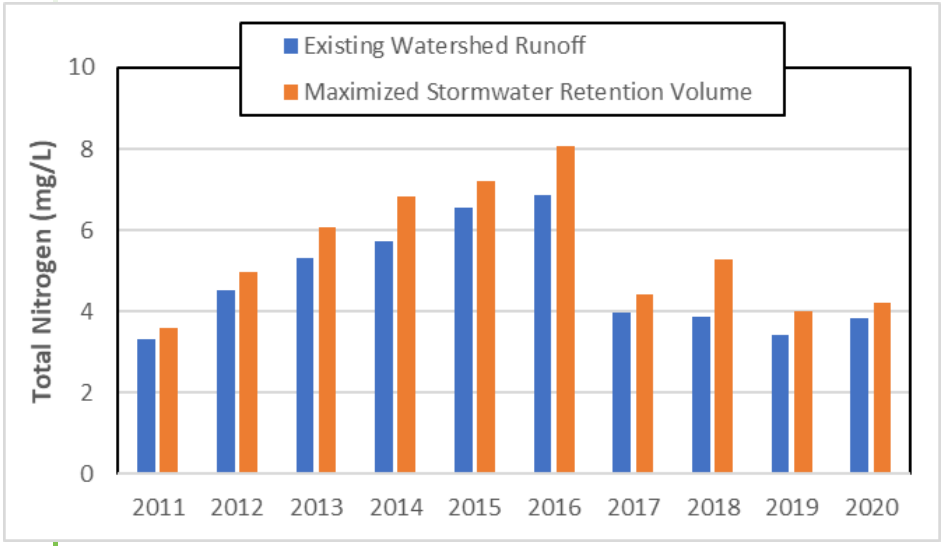
Current Hydrology with Reclaimed Water

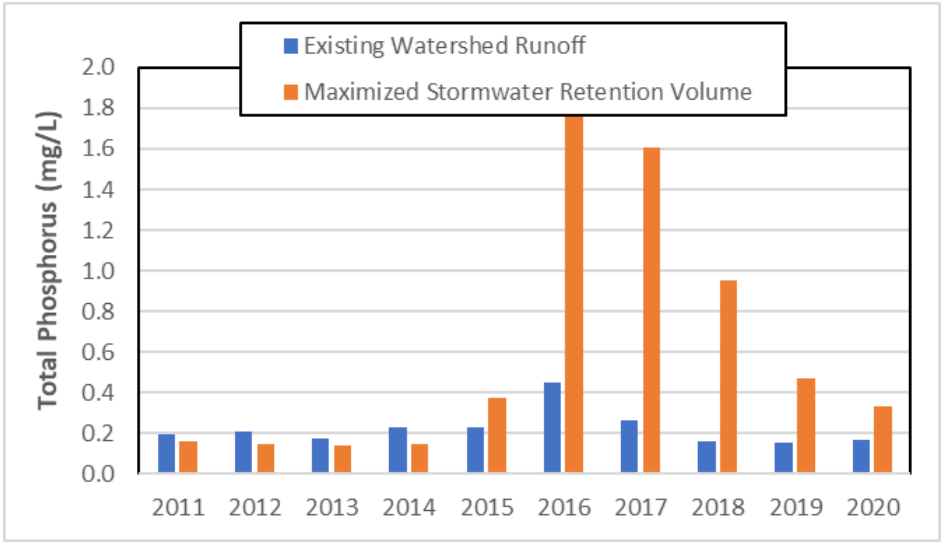
- Water level simulation for current RW addition at measured inflows compared with 70% of measured inflows (estimate after on-site retention of WQ storm for all developed lands)
- Stormwater is an important source of fresh water for Lake Elsinore
- Lower TDS than reclaimed water



Lake Water Quality Results

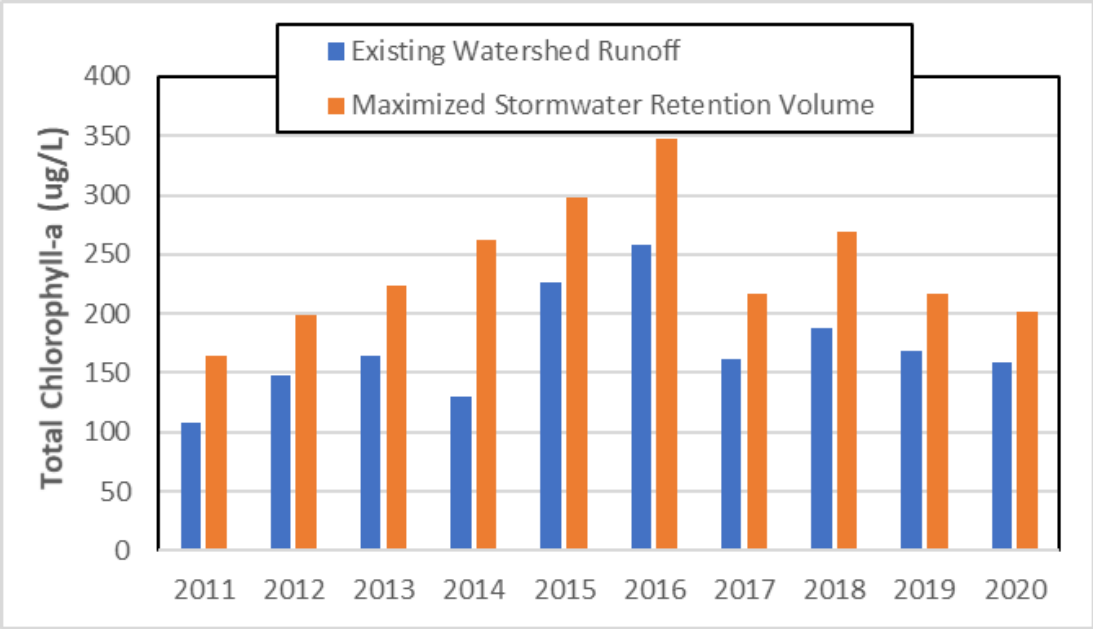
- Decreased watershed runoff reduces loading to Lake Elsinore, but increase bioavailable nutrients in water column





Lake Water Quality Results

- Decreased watershed runoff reduces loading to Lake Elsinore, but increases algae



Lake Water Quality Results

- Decreased watershed runoff reduces loading to Lake Elsinore, but increase bioavailable nutrients in water column

	Watershed TN Load (kg/yr)	TN in Lake Elsinore (mg/L)	Watershed TP Load (kg/yr)	TP in Lake Elsinore (mg/L)
Measured Runoff	14,250	4.74	3,389	0.22
Maximize Stormwater Retained in Watershed	9,975 ↓	5.47 ↑	2,372 ↓	0.48 ↑

Next Steps

Next Steps

- To adequately address peer review comments, Regional Board requires a change in the current numeric targets and allocations to GLM derived outputs for the alternative reference condition
  - With levee
  - 25th percentile of Cranston Guard Station as reference nutrient concentration (0.16 mg/L TP; 0.68 mg/L TN)
- Update technical report
- Adopt TMDL revision