

North Central Texas

Water Quality Project



**Cedar Creek Watershed
Point Source Evaluation**

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North Central Texas



Water Quality Project

Objectives

- Evaluate permitted point source nutrient loads in the Cedar Creek Reservoir watersheds
- Identify significant sources of nutrients
- Quantify both current and long-term impacts
- Evaluate treatment practices available for maintaining and improving water quality
- Address costs of implementing those practices

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Approach

- Each plant was assessed for the ability to properly treat projected 2050 flows under three sets of discharge limits for nutrients.
 - Level I:** Existing permit conditions
 - Level II:** Phosphorus limit of 1 mg/L
Total nitrogen limit of 10 mg/L
 - Level III:** Phosphorus limit of 0.5 mg/L
Total nitrogen limit of 5 mg/L

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Approach (continued)

- Plant effluent quality was examined and characterized for current treatment level
- Field assessment and permit review led to recommended facilities upgrades and conceptual level cost estimates
- Individual plant and total nutrient loads were calculated based on current, Level II and Level III permit limits for projected 2050 flows

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Data Sources

- For Existing Plant Capacity and Condition
 - Field evaluations
 - Permit review
 - Discussions with plant staff
 - Surveys (when completed)
- For Current Treatment Capability
 - Review of Discharge Monitoring Reports (DMRs)
 - Nutrient testing done by the cities for TRWD
- For Projected Flows
 - Calculated primarily from projected populations at 100 gpd/ per capita
- For Projected Populations
 - Texas Water Development Board
 - Provided by facility

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Wastewater Treatment Plants Evaluated



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Nutrient Loads* Associated with Each Level Upgrade (2050 Loads vs. Current)

City or Facility	Total Nitrogen Load (lbs/day)			
	Current Permitted Flow	2050 Flows		
		Level I	Level II	Level III
Athens	116	129	95	48
Cherokee Shores	47	57	15	8
East Cedar Creek	122	312	133	67
Eustace	25	25	11	5
Kaufman	135	186	138	69
Kemp	24	14	9	5
Mabank	39	51	43	22
Terrell	740	947	480	240
Wills Point	80	51	43	21
Total Loads	1,328	1,772	967	485
Increase or (Decrease) from Current Load		444	(361)	(843)

*Current and Level I loads based on average effluent concentration determined by nutrient testing done by the cities

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Nutrient Loads* Associated with Each Level Upgrade (2050 Loads vs. Current)

City or Facility	Total Phosphorous Load (lbs/day)			
	Current Permitted Flow	2050 Flows		
		Level I	Level II	Level III
Athens	24	27	10	5
Cherokee Shores	5	6	2	0.8
East Cedar Creek	11	29	13	7
Eustace	5	5	1	0.5
Kaufman	29	39	14	7
Kemp	5	3	0.9	0.5
Mabank	13	17	4	2
Terrell	151	194	48	24
Wills Point	18	11	4	2
Total Loads	261	331	97	49
Increase or (Decrease) from Current Load		70	(164)	(212)

*Current and Level I loads based on average effluent concentration determined by nutrient testing done by the cities

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Nutrient Removal Using Physical/Chemical Processes

Sample:

- Level II
 - Denitrifying filters
 - Alum addition for phosphorous removal
 - Additional solids handling capacity
- Level III
 - Level II
 - Begin feeding a carbon source (methanol) for denitrification
 - Increase alum feed rate