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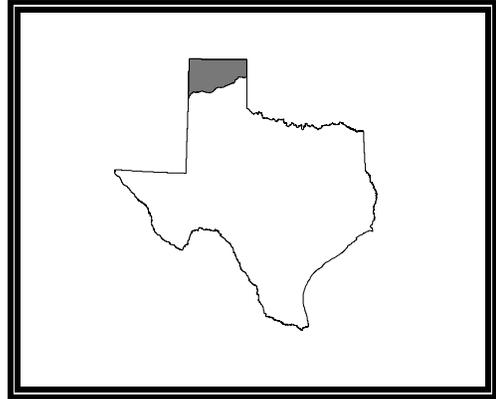
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# Basin 01

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## Canadian River



## Canadian River Basin Narrative Summary

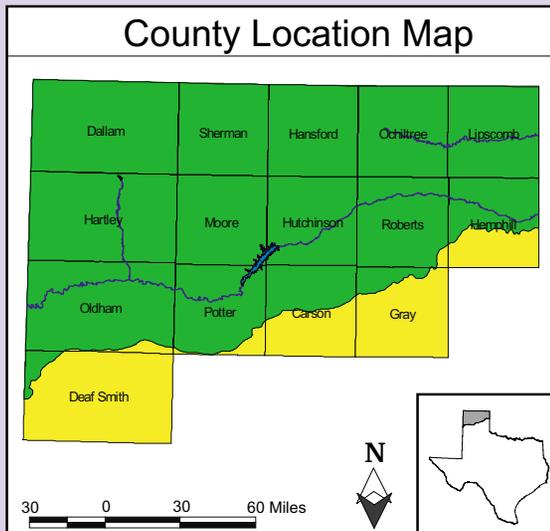
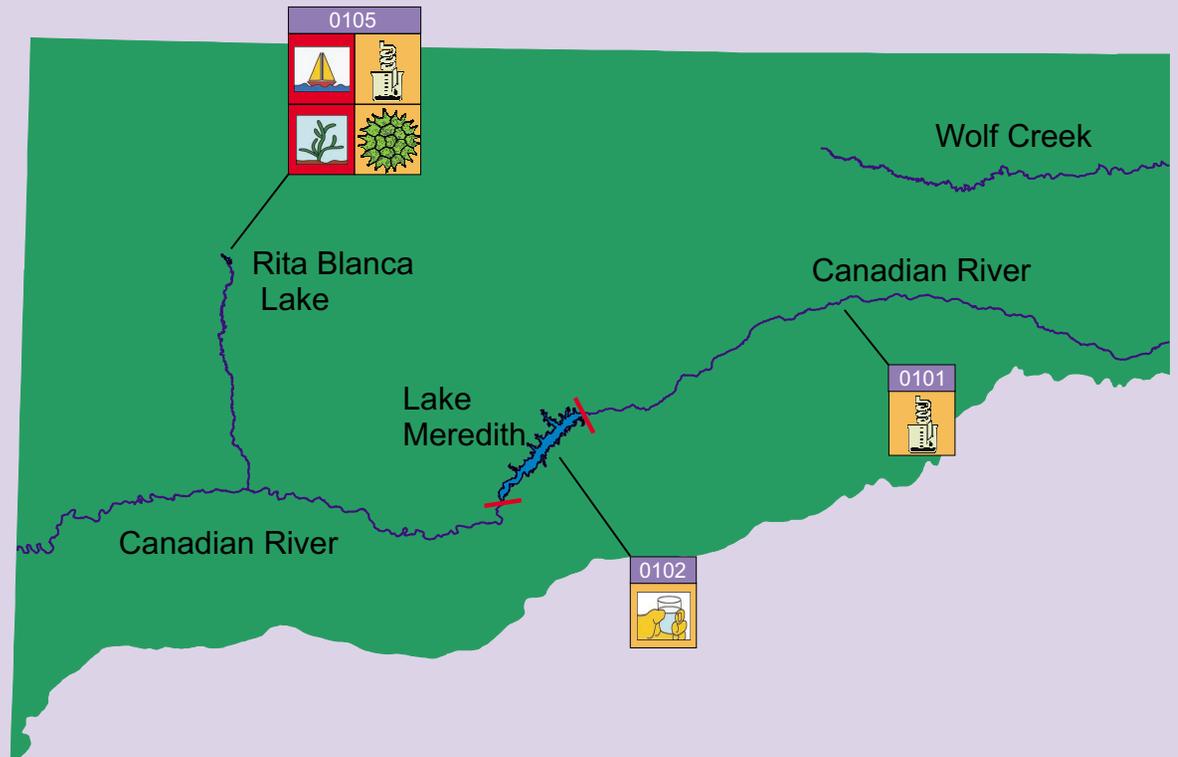
The Canadian River originates in northeastern New Mexico, flows eastward across the Texas Panhandle into Oklahoma, and merges with the Arkansas River. The economy of the river basin is based on agriculture, agribusiness, oil and gas production, and varied manufacturing activities.

The Canadian River Basin is a semi-arid region; virtually treeless with native deciduous timber only along the fringes of the streams and reservoirs. Salt cedar, a deleterious non-native woody plant, has become established and is spreading throughout the basin.

The Canadian River Basin is divided into five classified segments. The segments include 294 miles of river and tributary streams and two reservoirs, Lake Meredith on the Canadian River (16,504 acres) and Lake Rita Blanca (524 acres) on Rita Blanca Creek. There are 24 monitoring stations in the basin at which water quality data are collected by the TNRCC, the USGS, or the CRA.

The principal water quality problems in the Canadian River basin are elevated total dissolved solids and chloride levels. The Canadian River at the New Mexico-Texas state line is moderately saline during low flow due to natural conditions. Additionally, a natural brine artesian aquifer with total dissolved solids greater than 30,000 mg/L seeps into the river near the Texas-New Mexico border. The high chloride levels affect water quality in Lake Meredith. The city of Dalhart discharges treated domestic wastewater directly to Rita Blanca Lake. As a result, the reservoir has become very productive and experiences algal blooms and elevated pH levels.

# Canadian River Basin Identified Water Quality Issues



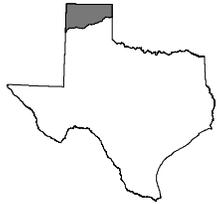


# Canadian River Basin Graphical Summary

Basin Map	Water Bodies									
	Segment 0101 Canadian River Below L. Meredith	Segment 0101 A Dixon Creek	Segment 0102 Lake Meredith	Segment 0102A Big Blue Creek	Segment 0103 Canadian River Above L. Meredith	Segment 0103A East Amarillo Creek	Segment 0103B Punta De Aqua Creek	Segment 0104 Wolf Creek	Segment 0105 Rita Blanca Lake	Segment 0199A Palo Duro Reservoir
<b>DESIGNATED USE SUPPORT</b>										
Contact Recreation	S	N	S	S	S	S	S	S	X	S
Noncontact Recreation	X	X	X	X	X	X	X	X	N	X
Public Water Supply	X	X	S	X	X	X	X	X	X	X
<b>Fish Consumption</b>										
Human Health	NA	NA	S	NA	S	NA	NA	NA	NA	NA
Advisories/Closures	NA	NA	S	NA	NA	NA	NA	NA	NA	S
<b>Aquatic Life</b>										
Dissolved Oxygen (Grab)	S	P	S	S	S	S	S	S	S	P
Dissolved Oxygen (24-Hour)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in Water	NA	NA	NA	NA	S	NA	NA	NA	NA	NA
Organics in Water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity Tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity Tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>GENERAL USE SUPPORT</b>										
Water Temperature	S	X	S	X	S	X	X	S	S	X
pH	S	X	S	X	S	X	X	S	P	X
Chloride	S	X	S	X	S	X	X	S	N	X
Sulfate	S	X	S	X	S	X	X	S	S	X
Total Dissolved Solids	S	X	S	X	S	X	X	S	N	X

S = Support; P = Partial Support; N = Nonsupport; T = Threatened; NC = No Concern; C = Concern;  
 NA = Not Assessed; X = Not Applicable

**Canadian River Basin Graphical Summary (Continued)**

Basin Map	Water Bodies									
	Segment 0101 Canadian River Below L. Meredith	Segment 0101 A Dixon Creek	Segment 0102 Lake Meredith	Segment 0102A Big Blue Creek	Segment 0103 Canadian River Above L. Meredith	Segment 0103A East Amarillo Creek	Segment 0103B Punta De Aqua Creek	Segment 0104 Wolf Creek	Segment 0105 Rita Blanca Lake	Segment 0199A Palo Duro Reservoir
										
<b>WATER QUALITY CONCERNS</b>										
Contact Recreation	X	X	X	X	X	X	X	X	X	X
Noncontact Recreation	X	X	X	X	X	X	X	X	X	X
Fish Tissue	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
<b>Nutrient Enrichment</b>										
Ammonia Nitrogen	C	NA	NC	NA	NC	NC	NA	NC	C	NC
Nitrite + Nitrate Nitrogen	NC	NA	NC	NA	NC	C	NA	NC	NA	NC
Orthophosphorus	NC	NA	NA	NA	NC	NC	NA	NC	NA	NC
Total Phosphorus	NC	NA	NA	NA	NC	NC	NA	NC	C	NC
Chlorophyll <i>a</i>	NC	NA	NA	NA	NC	NC	NA	NC	C	NC
<b>Public Water Supply</b>										
Finished Water Chloride	X	X	C	X	X	X	X	X	X	X
Finished Water Sulfate	X	X	C	X	X	X	X	X	X	X
Finished Water TDS	X	X	C	X	X	X	X	X	X	X
Surface Water Chloride	X	X	C	X	X	X	X	X	X	X
Surface Water Sulfate	X	X	NC	X	X	X	X	X	X	X
Surface Water TDS	X	X	C	X	X	X	X	X	X	X
<b>Aquatic Life</b>										
Dissolved Oxygen	X	X	X	X	X	X	X	X	X	X
Metals in Water	NA	NA	NA	NA	X	NA	NA	NA	NA	NA
Organics in Water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity Tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity Tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

# Canadian River Basin

## Segment 0101 - Canadian River Below Lake Meredith

**Water body description:** From the Oklahoma state line in Hemphill County to Sanford Dam in Hutchinson County.

**Water body classification:** Classified

**Water body type:** Freshwater Stream

**Water body length / area:** 97.00 Miles

**Use support summary:** Available data indicate that the aquatic life, contact recreation, and general uses are supported. The fish consumption use was not assessed due to insufficient data.

**Water quality concerns summary:** Ammonia nitrogen is a concern in the upper reaches of the segment.

### Monitoring sites used in the assessment

Station	Station Description
10032	Canadian River bridge at US 60-83 at Canadian
10033	Canadian River bridge on SH 70 north of Pampa
10034	Canadian River bridge at Plemons Road, south of city of Plemons
10035	Canadian River approx. 1.3 mi upstream from FM 2277 bridge

### Wastewater dischargers

Permit type	Number of outfalls
Agriculture	7
Domestic	11
Industrial	19

### Historical fish kills

Start date	Location	Fish killed	Suspected cause
06/24/1998	Dixon Creek - downstream of Phillips 66 Refinery near Borger, Texas	3,392	Inorganic compound

# Canadian River Basin

## Segment 0101A - Dixon Creek (unclassified water body)

**Water body description:** From confluence of the Canadian River to the upstream perennial portion of the stream east of Borger in Hutchinson County

**Water body classification:** Unclassified

**Water body type:** Freshwater Stream

**Water body length / area:** 19.00 Miles

**Use support summary:** The aquatic life use is partially supported due to depressed dissolved oxygen concentrations. The contact recreation use is not supported due to elevated fecal coliform bacteria densities. The fish consumption uses was not assessed due to insufficient data.

**Water quality concerns summary:** Water quality concerns were not assessed due to insufficient data.

**Additional information:** Projects are scheduled for dissolved oxygen and fecal coliform bacteria to do one or more of the following: assess the relevant water quality standard; to confirm the impairment; to conduct a total maximum daily load (TMDL) to evaluate the causes and sources and allocate the allowable loading; or to correct the impairment under another program. For more information on specific TMDL projects, visit the TNRCC Web site at [www.tnrcc.state.tx.us/water/quality/tmdl/](http://www.tnrcc.state.tx.us/water/quality/tmdl/).

### Monitoring sites used in the assessment

Station	Station Description
10016	Dixon Creek near Canadian River confluence NE of Borger

# Canadian River Basin

## Segment 0102 - Lake Meredith

**Water body description:** From Sanford Dam in Hutchinson County to a point immediately upstream of the confluence of Camp Creek in Potter County, up to normal pool level of 2936.5 feet (impounds Canadian River).

**Water body classification:** Classified

**Water body type:** Reservoir

**Water body length / area:** 16,504 Acres

**Use support summary:** Available data indicate that all uses are supported.

**Water quality concerns summary:** Average chloride, sulfate, and total dissolved solids in finished drinking water and average chloride and total dissolved solids in surface water are concerns.

### Monitoring sites used in the assessment

Station	Station Description
10036	Lake Meredith near intake tower at dam NE of Sanford
10037	Lake Meredith North Canyon arm
10039	Lake Meredith mid-lake southeast of Martin's Canyon
10040	Lake Meredith Evans Canyon
10041	Lake Meredith mid-lake west of Turkey Creek
10042	Lake Meredith mid-lake between Plum Creek boat ramp and Bates boat ramp
10043	Lake Meredith Bugbee Canyon at buoy line
10044	Lake Meredith North Turkey Creek Canyon arm
10045	Lake Meredith Big Blue Canyon between Chimney Hollow and Timber Hollow
10046	Lake Meredith Turkey Creek Canyon arm
10047	Lake Meredith Short Creek Canyon arm
10048	Lake Meredith Harbor Bay
10049	Lake Meredith Fritch Canyon arm

### Monitoring sites, continued

Station	Station Description
10050	Lake Meredith Meredith Harbor
10051	Lake Meredith Cedar Canyon arm
10052	Lake Meredith South Canyon arm

### Published studies

Publication	Date	Author
IMS 24 Lake Meredith	April 1975	Kirkpatrick, J.

### Wastewater dischargers

Permit type	Number of outfalls
Agriculture	7
Domestic	5

## Canadian River Basin

### Segment 0102A - Big Blue Creek (unclassified water body)

**Water body description:** From confluence of Lake Meredith in Carson County to the upstream perennial portion of the stream in Moore County

**Water body classification:** Unclassified

**Water body type:** Freshwater Stream

**Water body length / area:** 25.00 Miles

**Use support summary:** Available data indicate that the aquatic life and contact recreation uses are supported. The fish consumption use was not assessed due to insufficient data.

**Water quality concerns summary:** Water quality concerns were not assessed due to insufficient data.

#### Monitoring sites used in the assessment

Station	Station Description
15270	Big Blue Creek approx. 250 yds. upstream of FM 1913, 21 mi. SE of Dumas

# Canadian River Basin

## Segment 0103 - Canadian River Above Lake Meredith

**Water body description:** From a point immediately upstream of the confluence of Camp Creek in Potter County to the New Mexico State Line in Oldham County

**Water body classification:** Classified

**Water body type:** Freshwater Stream

**Water body length / area:** 116.00 Miles

**Use support summary:** Available data indicate that all uses are supported.

**Water quality concerns summary:** Available data indicate that there are no water quality concerns.

**Additional information:** A wasteload evaluation (WLE) for dissolved oxygen was approved in 1998 and has been incorporated into the state Water Quality Management Plan. Advanced waste treatment is required for one or more dischargers.

### Monitoring sites used in the assessment

Station	Station Description
10054	Canadian River bridge at US 87-287 north of Amarillo
10056	Canadian River bridge on US 385 north of Tascosa

### Published studies

Publication	Date	Author
IMS 76 Canadian River	April 1977	Dutton, R. (Region 1)
IS 86-09 Canadian River	April 1985	Ottmers, D.
IS 91-03 East Amarillo Creek	June 1989	Ottmers, D.

### Wastewater dischargers

Permit type	Number of outfalls
Agriculture	17
Domestic	15
Industrial	2

# Canadian River Basin

## Segment 0103A - East Amarillo Creek (unclassified water body)

**Water body description:** From the confluence of the Canadian River to the upstream perennial portion of the stream northwest of Amarillo in Potter County

**Water body classification:** Unclassified

**Water body type:** Freshwater Stream

**Water body length / area:** 23.00 Miles

**Use support summary:** Available data indicate that the aquatic life and contact recreation uses are supported. The fish consumption use was not assessed due to insufficient data.

**Water quality concerns summary:** Nitrite + nitrate nitrogen is a concern.

### Monitoring sites used in the assessment

Station	Station Description
10018	East Amarillo Creek at US 287 north of Amarillo

# Canadian River Basin

## Segment 0103B - Punta De Aqua Creek (unclassified water body)

**Water body description:** From the confluence of the Canadian River to the upstream perennial portion of the stream west of Channin in Hartley County

**Water body classification:** Unclassified

**Water body type:** Freshwater Stream

**Water body length / area:** 62.00 Miles

**Use support summary:** Available data indicate that the aquatic life and contact recreation uses are supported. The fish consumption use was not assessed due to insufficient data.

**Water quality concerns summary:** Available data indicate that there are no water quality concerns.

### Monitoring sites used in the assessment

Station	Station Description
10003	Punta de Agua Creek at FM 767 west of Channing

# Canadian River Basin

## Segment 0104 - Wolf Creek

**Water body description:** From the Oklahoma state line in Lipscomb County to a point 2.0 km (1.2 miles) upstream of FM 3045 in Ochiltree County.

**Water body classification:** Classified

**Water body type:** Freshwater Stream

**Water body length / area:** 81.00 Miles

**Use support summary:** Available data indicate that the aquatic life and contact recreation uses are supported in the upper 39 miles. General water quality uses are supported throughout the segment. The fish consumption use was not assessed due to insufficient data.

**Water quality concerns summary:** Available data indicate that there are no water quality concerns.

### Monitoring sites used in the assessment

Station	Station Description
10058	Wolf Creek bridge at SH 305 north of Lipscomb
10059	Wolf Creek at FM 1454, 27.4 km (17 mi) east of Lipscomb

### Wastewater dischargers

Permit type	Number of outfalls
Agriculture	24
Domestic	3

### Historical fish kills

Start date	Location	Fish killed	Suspected cause
10/07/1996	Wolf Creek - Near Perryton, TX	500	Disease

# Canadian River Basin

## Segment 0105 - Rita Blanca Lake

**Water body description:** From Rita Blanca Dam in Hartley County up to normal pool level of 3860 feet (impounds Rita Blanca Creek).

**Water body classification:** Classified

**Water body type:** Reservoir

**Water body length / area:** 524 Acres

**Use support summary:** The noncontact recreation use is not supported due to elevated fecal coliform densities. General water quality uses are partially supported due to elevated pH values and are not supported due to elevated average chloride and total dissolved solids concentrations. The aquatic life use is supported throughout the reservoir. The fish consumption use was not assessed due to insufficient data.

**Water quality concerns summary:** Ammonia nitrogen, total phosphorus, and chlorophyll *a* are concerns.

**Additional information:** Projects are scheduled for fecal coliform bacteria, pH, and dissolved solids to do one or more of the following: assess the relevant water quality standard; to confirm the impairment; to conduct a total maximum daily load (TMDL) to evaluate the causes and sources and allocate the allowable loading; or to correct the impairment under another pro-gram. For more information on specific TMDL projects, visit the TNRCC Web site at [www.tnrcc.state.tx.us/water/quality/tmdl/](http://www.tnrcc.state.tx.us/water/quality/tmdl/).

Data associated with the current proposal to revise the Texas Surface Water Quality Standards indicate that the appropriate criterion for evaluating the average concentration of chloride in this segment is 200 mg/L. Although the average concentration of chloride exceeds the current criterion, it does not exceed the revised criterion. Consequently, the TNRCC has not placed chloride on the 2000 303(d) List.

### Monitoring sites used in the assessment

Station	Station Description
10060	Rita Blanca Lake near outlet structure at dam south of Dalhart

### Published studies

Publication	Date	Author
IMS 47 Rita Blanca Lake	Dec. 1975	Ezell, C.

### Wastewater dischargers

Permit type	Number of outfalls
Agriculture	22
Domestic	5

# Canadian River Basin

## Segment 0199A - Palo Duro Reservoir (unclassified water body)

**Water body description:** From Palo Duro dam up to normal pool elevation of 2,892 feet north of Spearman in Hansford County (impounds Palo Duro Creek)

**Water body classification:** Unclassified

**Water body type:** Reservoir

**Water body length / area:** 2,410 Acres

**Use support summary:** The aquatic life use is partially supported due to depressed dissolved oxygen concentrations. The contact recreation and fish consumption uses are supported.

**Water quality concerns summary:** Available data indicate that there are no water quality concerns.

**Additional information:** A project is scheduled for dissolved oxygen to do one or more of the following: assess the relevant water quality standard; to confirm the impairment; to conduct a total maximum daily load (TMDL) to evaluate the causes and sources and allocate the allowable loading; or to correct the impairment under another program. For more information on specific TMDL projects, visit the TNRCC Web site at [www.tnrcc.state.tx.us/water/quality/tmdl/](http://www.tnrcc.state.tx.us/water/quality/tmdl/).

### Monitoring sites used in the assessment

Station	Station Description
10005	Palo Duro Reservoir at boat launch near dam 19 km north of Spearman