

Geronimo and Alligator Creeks



Water Quality
Conditions and
Concerns



Presentation Overview

- Description of Geronimo and Alligator Creeks Watershed

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- TCEQ Water Quality Standards and Stream Assessment for Geronimo Creek

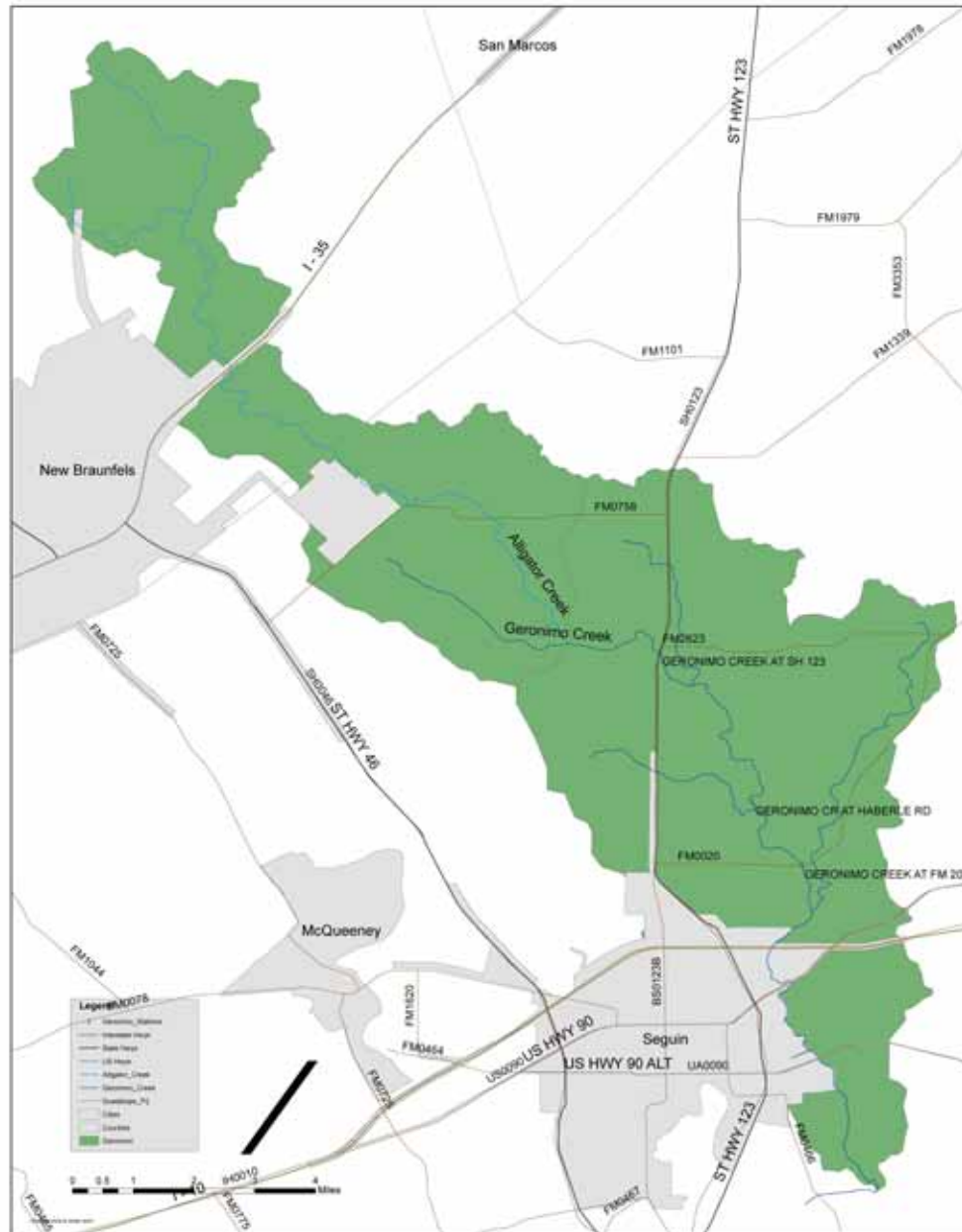
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- Description of Geronimo and Alligator Creeks Watershed
- TCEQ Water Quality Standards and Stream Assessment for Geronimo Creek
- GBRA Historical Monitoring of Geronimo Creek

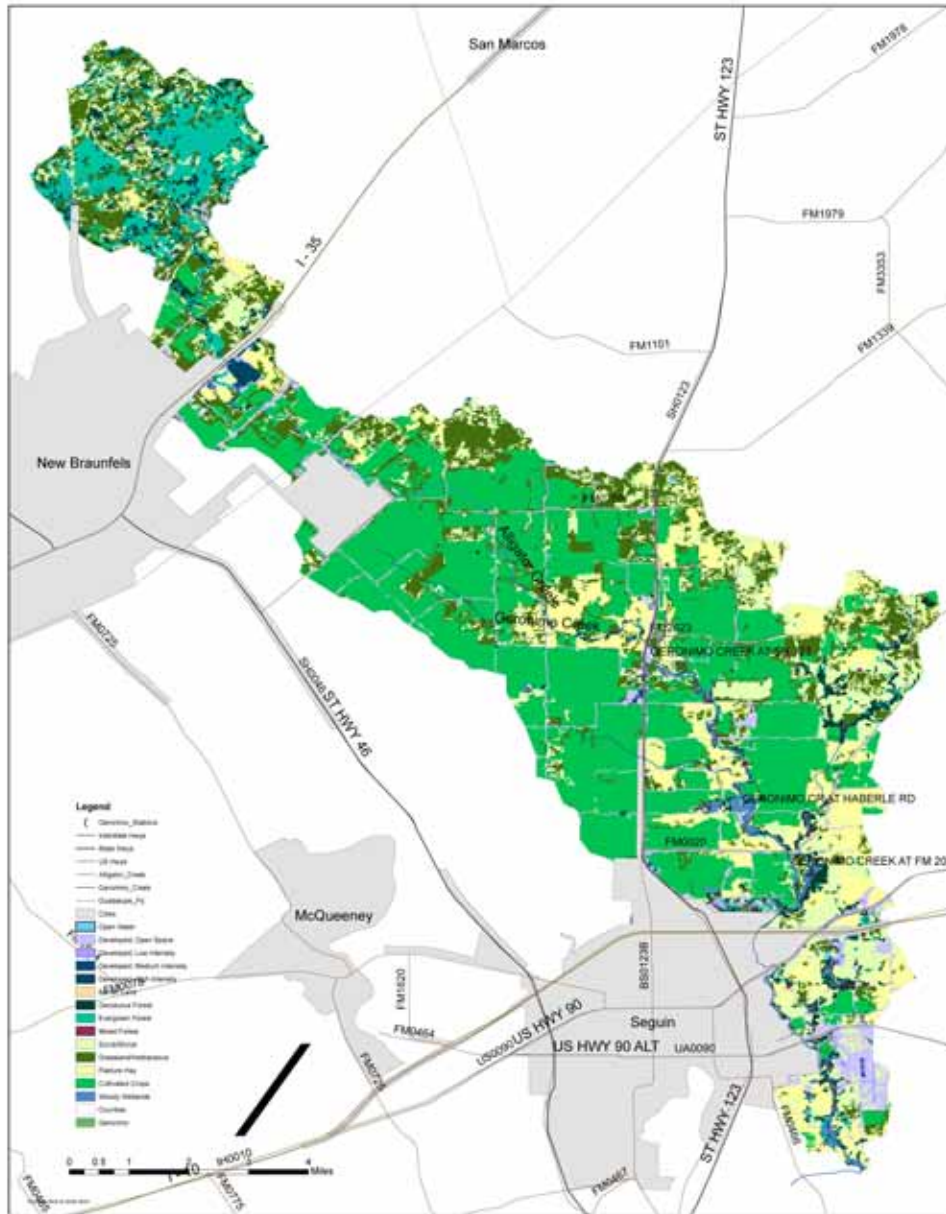
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- Description of Geronimo and Alligator Creeks Watershed
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- GBRA Historical Monitoring of Geronimo Creek
- Geronimo Creek Monitoring Program

Geronimo and Alligator Creeks Watershed



Geronimo and Alligator Creeks Watershed



Climate:

Average
rainfall -

29 in/yr

Average temp

- Jan 35°

- July 95°

Water Quality Standards for Streams in Texas

WQ Standard is made up of two parts:

Designated uses

Criteria to meet those uses

Based on flow

Designated Uses

Contact Recreation



Designated Uses

Contact Recreation



Aquatic Life Use

Designated Uses

Contact Recreation



Aquatic Life Use



Domestic Water Supply

Flow in Alligator and Geronimo Creeks

- Alligator Creek
 - Intermittent with and without perennial pools
 - “Limited” aquatic life
 - Protected by 3.0 mg/L Dissolved Oxygen



At Barbarossa Road



At Huber Road, just upstream of confluence

Flow in Alligator and Geronimo Creeks

- Geronimo Creek
 - Perennial stream
 - “High” aquatic life use

5.0 mg/L

Dissolved Oxygen



Numeric Stream Standards

For Contact Recreation:

E. coli

- 126 organisms/100mL
(geometric mean)
- 394 organisms/100mL
(single grab sample)



Numeric Stream Standards

For High Aquatic Life Use – Geronimo Creek

- 5.0 mg/L Dissolved Oxygen
- 6.5 – 9.0 pH
- 90°F (32.2°C)



TCEQ Stream Assessments

All streams in Texas assessed every two years:

305b Water Quality Inventory and 303d List

Use previous seven years of data

Look for number of exceedences of stream standard

Sources of data include Clean Rivers Program, TCEQ Regional Staff, Surface Water Quality Monitoring Team

Geronimo Creek

Aquatic Life and General Uses Met



Standards Not Met....

- Geronimo Creek – Listed on 303d list



Contact Recreation Use

Elevated E. coli –

162 organisms/100 mL

Concern.....

- **Geronimo Creek –**



**Nutrient Enrichment -
Nitrate Nitrogen**

**60 samples
exceeded screening
concentration of 1.95
mg/L**

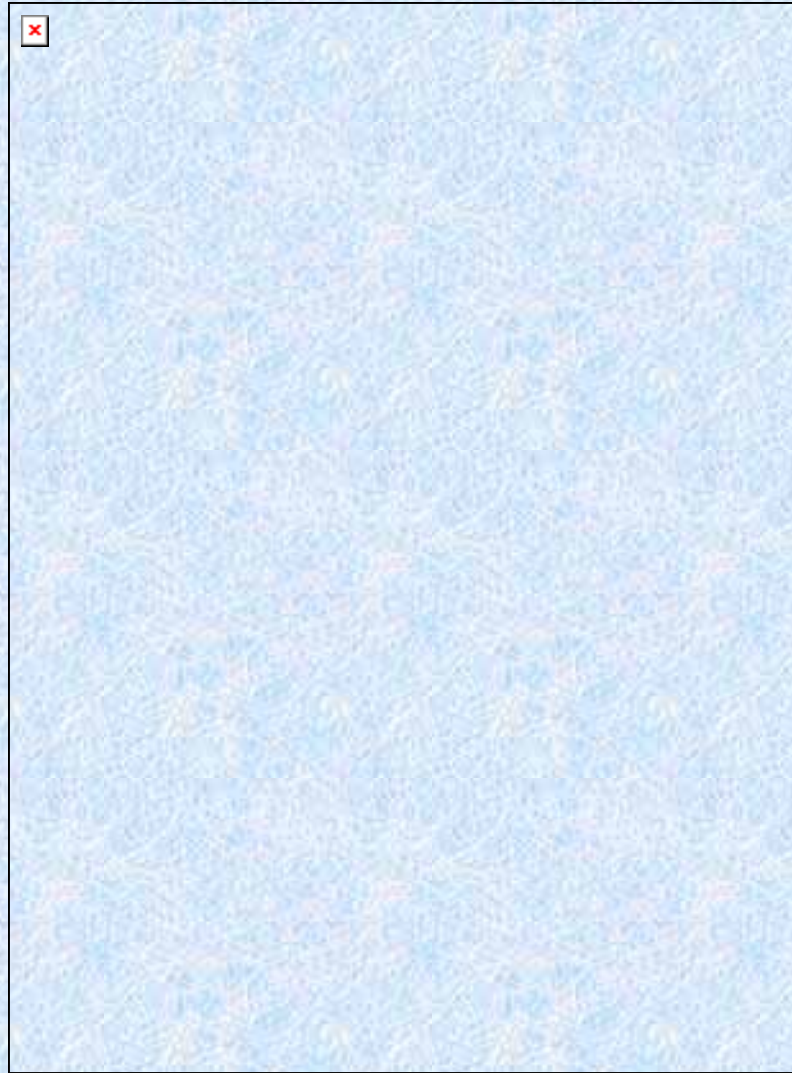
**Human and Animal
Health Concern**

**Drinking water
standard – 10 mg/L**

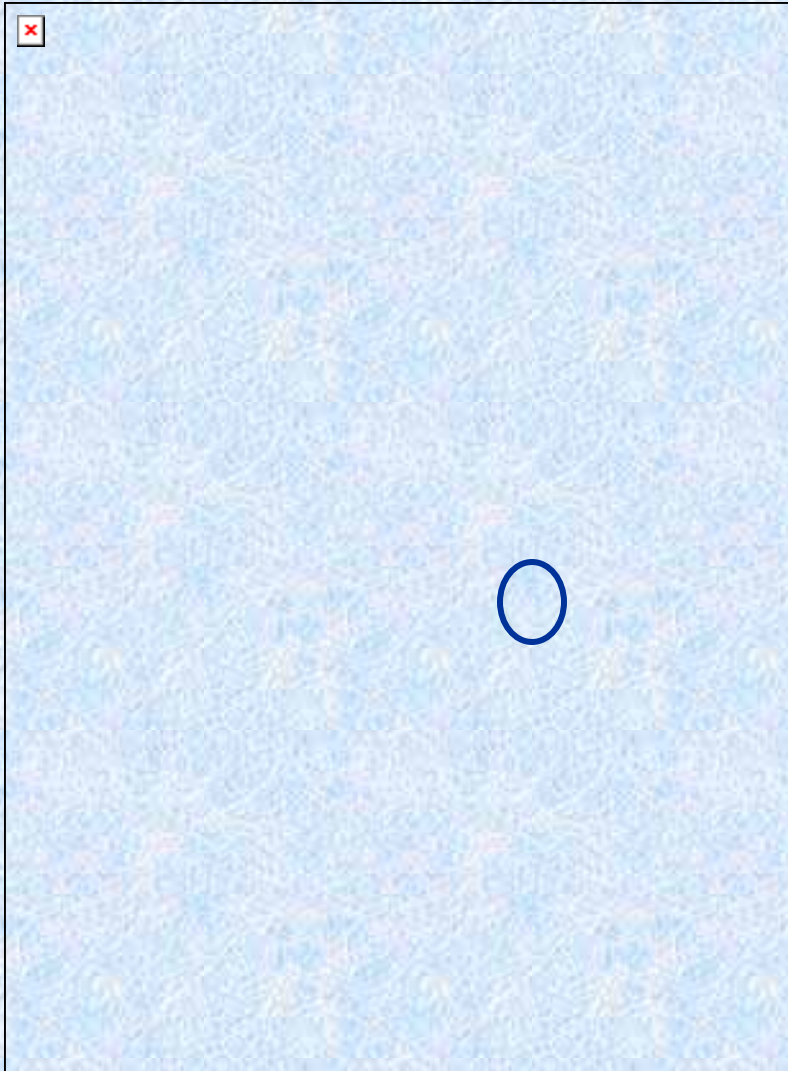
GBRA Monitoring Program



GBRA Monitoring Program



Geronimo Creek at SH 123



-Monitoring since late 1996; moved in 2003

-Monthly -
Conventional, Flow,
Nutrients, Bacteria

-Location of Rain Gage

Geronimo Creek at SH 123



Geronimo Creek at SH 123

(October 1996 – September 2003)

	<u>Median</u>	<u>Range</u>
Dissolved Oxygen, mg/L (5.0mg/L)	9.15	6.0 – 12.5
Specific Conductance, umhos/cm	919	755 - 1013
Temperature, °C (32.2oC)	21.5	15.6 – 26.4
Total Suspended Solids, mg/L	14.8	5.3 – 40.4
Turbidity, NTU	6.2	3 - 76
Chloride, mg/L (100 mg/L)	61.1	38.4 – 93.4
Sulfate, mg/L (50 mg/L)	56.9	11.6 - 235
Hardness, mg/L	318	175 - 430
Chlorophyll a, ug/L (14.1 ug/L)	<1	<1 – 13.4

Geronimo Creek at SH 123

(October 1996 – September 2003)

	<u>Median</u>	<u>Range</u>	<u>Standard</u>
Flow, cfs	4.93	1.1 – 19	
Nitrate Nitrogen, mg/L	9.99	5.2 - 18.2	1.95 / 10.0
E. coli, org/100 mL	144*	4 - 1497	126*

* Geometric mean

2006 303d list – 162 org/100 mL

Geronimo Creek at SH 123

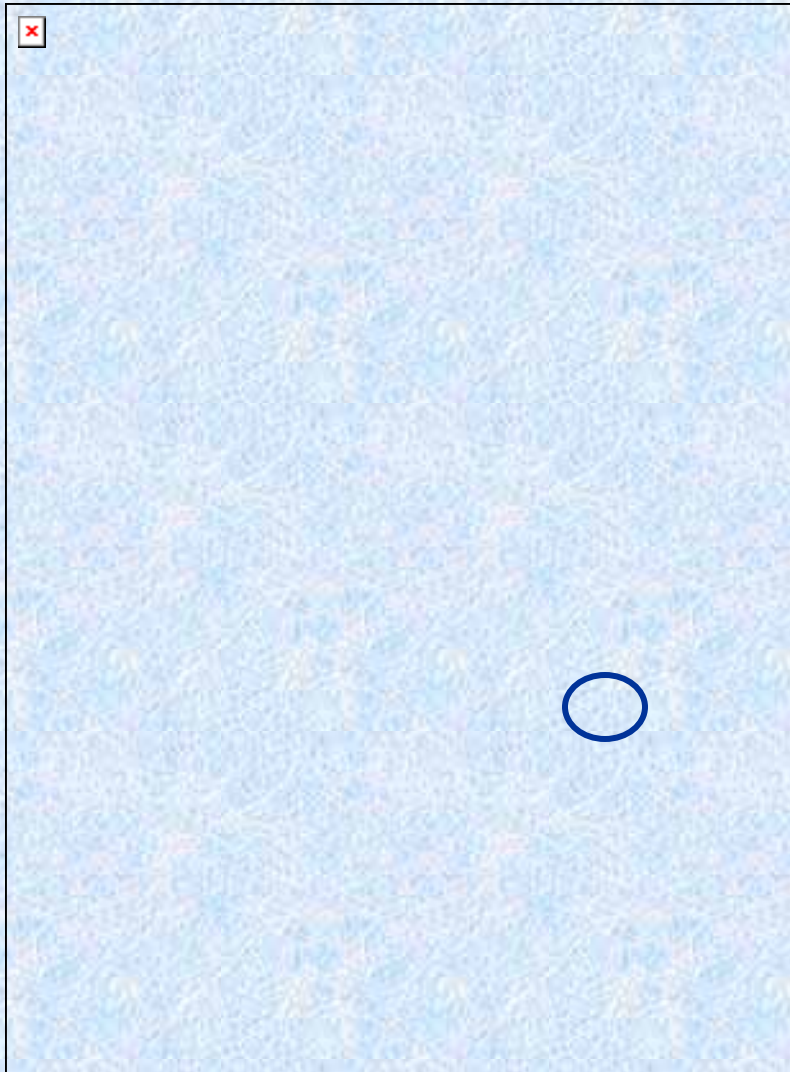
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Geronimo Creek at Haberle Road



- Replaced SH123 site
- 5 miles downstream
- Monitoring since 2003
- Monthly –
Conventional, Flow,
Nutrients, Bacteria
- Annual – Biological
Assessments
- Ecoregion Reference
Site

Geronimo Creek at Haberle Road



Geronimo Creek at Haberle Road

(October 2003 – September 2007)

	<u>Median</u>	<u>Range</u>
Dissolved Oxygen, mg/L (5.0 mg/L)	9.21	6.9 - 13
Specific Conductance, umhos/cm	875	485 - 982
Temperature, °C (32.2oC)	22.9	11.9 - 27
Total Suspended Solids, mg/L	7	1 - 60.7
Turbidity, NTU	6.2	3 - 76
Chloride, mg/L (100 mg/L)	40.4	20.6 - 80
Sulfate, mg/L (50 mg/L)	64	32.5 - 85
Hardness, mg/L	310	184 - 334
Chlorophyll a, ug/L (14.1 ug/L)	<1	<1 - 5

Geronimo Creek at Haberle Road

(October 2003 – September 2007)

	<u>Median</u>	<u>Range</u>	<u>Standard</u>
Flow, cfs	12.34	3.4 - 59	
Nitrate Nitrogen, mg/L	14.5	5.6 - 16.8	1.95/10.0
E. coli, org/100 mL	156*	44 - 4834	126*

* Geometric mean

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Geronimo Creek at Haberle Road

(October 2003 – September 2007)

	<u>Median</u>	<u>Range</u>	<u>Standard</u>
Flow, cfs	12.34	3.4 - 59	
Nitrate Nitrogen, mg/L	14.5	5.6 - 16.8	1.95/10.0
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Comparison of two GBRA sites

(GBRA data only – entire historical data set)

	<u>SH 123</u>	<u>Haberle</u>
Flow, cfs	4.93	12.34
Nitrate Nitrogen, mg/L	9.99	14.5
E. coli, org/100 mL	150*	156*

* Geometric mean

2006 303d list – 162 org/100 mL

TCEQ Historical Site



-Monitoring 1990-91

-Very little data collected

-Some biological data

Geronimo Creek at FM 20

Timing is everything!

- Stream listed on 303d – E.coli (2006)

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- Stream listed on 303d – E.coli (2006)
- Concern for Nitrates (2002)
- Guadalupe County Flood Mitigation Study
- City of Seguin Long Range Planning Efforts
- Growth in Alligator Creek – need for wastewater treatment

Geronimo Creek Project Monitoring Component

- **May 2009 – April 2010**
- Routine monitoring at 7 sites/monthly
- Targeted monitoring at 15 sites quarterly (wet conditions/dry conditions)
- Heavy metals – 3 routine sites and one groundwater/annual
- Three groundwater site/quarterly
- One wastewater site/quarterly

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Geronimo Creek Project Monitoring Component

- **Parameters:**

- Field parameters – pH, Dissolved Oxygen, Temperature, Specific Conductance
- Conventional parameters – TSS, Turbidity, Sulfate, Chloride, Chlorophyll a, Ammonia-Nitrogen, Nitrate-Nitrogen, Hardness, Total Phosphorus
- Flow
- E. coli
- Effluent Parameters -BOD, CBOD, COD
- Heavy Metals – Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Zn

Geronimo Creek Project Monitoring Component

- Collected under an approved Quality Assurance Project Plan
- Hampered by extreme drought
- Will post data on website
- Will submit data to TCEQ to be used in future assessments