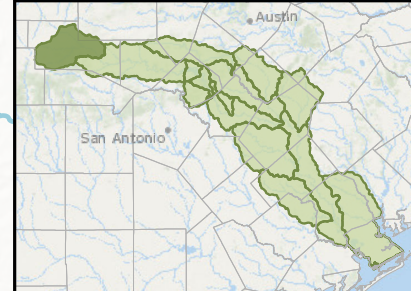


GUADALUPE RIVER ABOVE FLAT ROCK DAM

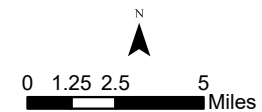


Guadalupe River Above Flat Rock Dam Watershed Summary

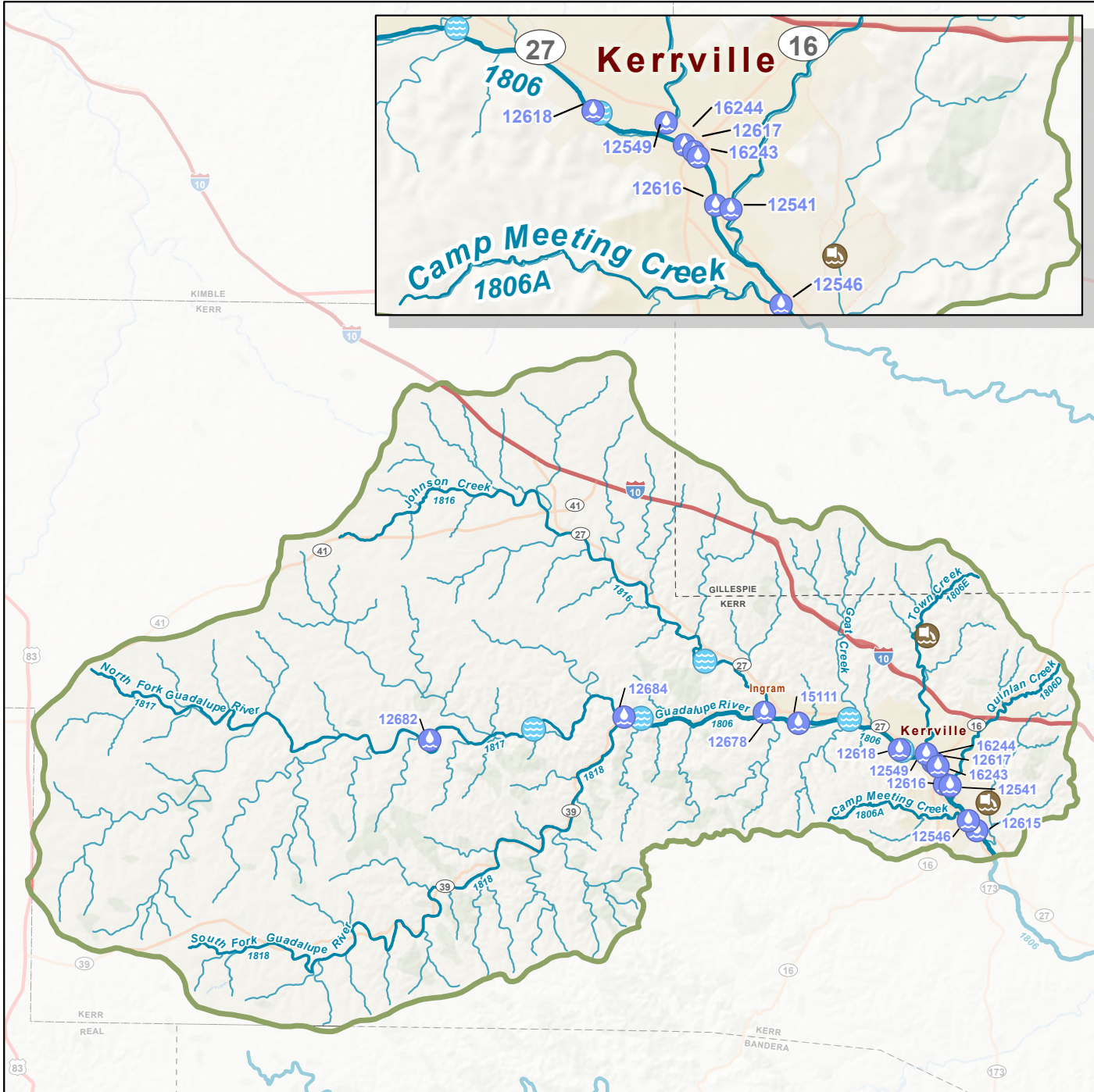
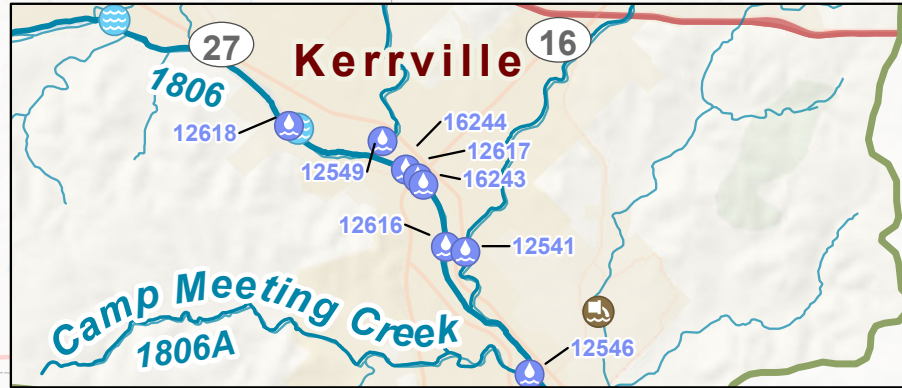
Guadalupe River Basin



- USGS Stream Gage
- Water Quality Monitoring (UGRA)
- Wastewater Outfall (TCEQ)
- Major River/Stream
- Stream
- Major Roads**
 - State Highway (SH)
 - US Highway (US)
 - Interstate Highway (IH)
- Watershed Boundary
- County



DISCLAIMER: The data contained in this map is not survey grade and is provided for informational and reference purposes only. The Guadalupe-Blanco River Authority makes no claim or guarantee for the accuracy or validity of the information presented herein.



Segments

Segment 1818 - South Fork Guadalupe River

Segment 1817 - North Fork Guadalupe River

Segment 1816 - Johnson Creek

Segment 1806 - Guadalupe River Above Canyon Lake



Photo 4: Monitoring Water Quality Near a Low-Head Dam in the South Fork Guadalupe River at Hunt Crossing

and cool, clear rivers in the area have led to an increase in population and urban sprawl over the years. Swimming, fishing, and kayaking are popular in this watershed. Additionally, there are several summer camps along the banks of the streams throughout this watershed. Many of these camps have low-head dams (Photo 4) on the river near their property that create swimming holes for the campers.

This watershed is monitored by UGRA. Overall, water quality remains exceptional, and there has been very little change in primary water quality parameters over the last decade.

Segment Summaries

The Guadalupe River watershed above Flat Rock Dam consists of several segments, which are described further below. This watershed lies mostly within Kerr County, with a small portion of the drainage basin also covering a portion of southwestern Gillespie County. Soil types in this watershed range from dark and loamy soils over limestone substrate to loam with clay subsoils, which is typical of the Edwards Plateau ecoregion. This watershed falls within the hill country region of Texas; as the name would suggest, this area is characterized by hilly topography and is considered to be the border between the American Southwest and Southeast. Historically this area has been generally rural; however, the scenic views



Confluence of the North and South Fork Guadalupe River in Kerr County

South Fork Guadalupe River (1818)

South Fork Guadalupe River is a 27-mile-long stream that extends from the confluence with the main stem of the Guadalupe River in Hunt to a point upstream of FM 187 in Kerr County. Segment 1818 is one of the three segments that comprise the headwaters of the Guadalupe River.

Segment 1818 is monitored by Upper Guadalupe River Authority (UGRA) at two stations. No significant increasing or decreasing trends were identified in this segment.

Segment 1818 has concerns for impaired fish, habitat and macrobenthic community. These concerns are thought to be a result of lower than normal flow due to drought conditions during the assessment period. GBRA and UGBRA are conducting Aquatic Life Monitoring Events in these segments to assess if these concerns reflect actual conditions.

Station ID	Dissolved Oxygen	Biologicals	Bacteria	Temperature	Nutrients	Chlorophyll a
12684	M	I	M	M	M	M

M - Meets water quality criteria

I - Impaired for water quality criteria

Table 3: Summary of the 2022 Texas Integrated Report / Segment 1818

North Fork Guadalupe River (1817)

North Fork Guadalupe River is a 29-mile-long stream that extends from the confluence with the main stem of the Guadalupe River in Hunt to a point upstream of Boneyard Draw in Kerr County. Segment 1817 is one of the three segments that comprise the headwaters of the Guadalupe River.

Segment 1817 is monitored by Upper Guadalupe River Authority (UGRA) at one station. No significant trends were identified in this segment.

Segment 1817 has concerns for impaired fish, habitat, and macrobenthic community. These concerns are thought to be a result of lower than normal flow due to drought conditions during the assessment period. GBRA and UGRA are conducting Aquatic Life Monitoring Events in these segments to assess if these concerns reflect actual conditions.

Station ID	Dissolved Oxygen	Biologicals	Bacteria	Temperature	Nutrients	Chlorophyll a
12682	M	I	M	M	M	M

M - Meets water quality criteria

I - Impaired for water quality criteria

Table 4: Summary of the 2022 Texas Integrated Report / Segment 1817

Johnson Creek (1816)

Johnson Creek is a 21-mile-long stream that extends from the confluence with the main stem of the Guadalupe River near Ingram to SH 41 in western Kerr County. Segment 1816 is one of the three segments that comprise the headwaters of the Guadalupe River. The watershed around Johnson Creek is mostly rural with low density urban development and there are a few summer camps upstream of Ingram.

Segment 1816 is monitored by UGRA at one station. Water quality in this segment is exceptional and there has been little variation in water quality parameters over time.



Johnson Creek at Byas Springs Road

Station ID	Dissolved Oxygen	Biologicals	Bacteria	Temperature	Nutrients	Chlorophyll a
12678	M	C	M	M	M	M

M - Meets water quality criteria
C - Concern for water quality criteria

Table 5: Summary of the 2022 Texas Integrated Report / Segment 1816

Data analysis from segment 1816 showed that chloride is significantly decreasing and the trend is significantly correlated with flow. Rainfall was below average during the 10-year period of this analysis; decreased runoff could be contributing to this decrease.

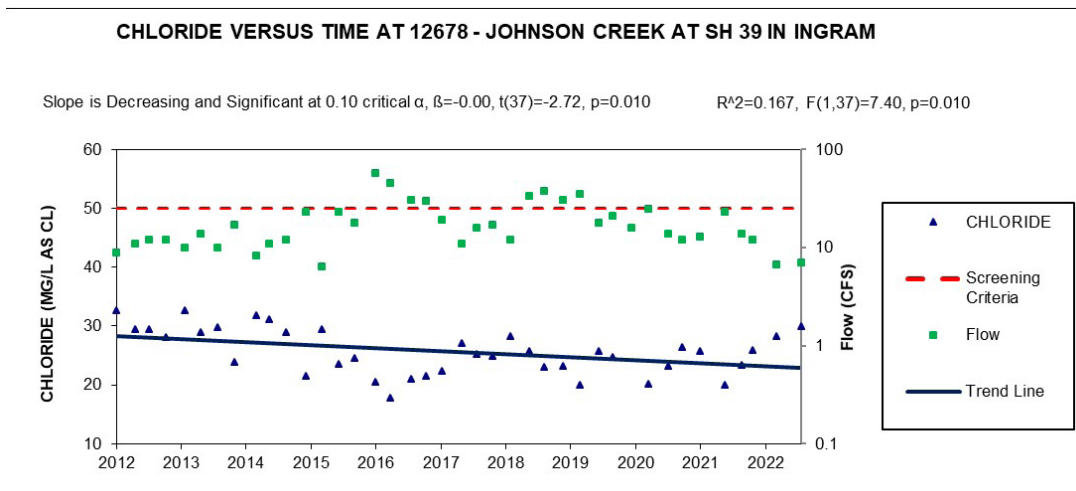


Figure 2: Chloride trend at Station 12678

Guadalupe River Above Canyon Lake (1806)

Guadalupe River above Canyon Lake is a 103-mile-long segment that flows from the confluence between the North and South Forks in Kerr county to Canyon Lake in Comal county. This summary report will divide the segment into two sub-watersheds. For information on the lower 96 miles of this segment, refer to the 'Guadalupe River below Flat Rock Dam' chapter. This section will cover the upper seven miles of the segment that flows from the confluence of the North and South Forks to Flat Rock Dam in Kerrville, as well as several tributaries of 1806 including Goat Creek (1806C), Town Creek (1806E), Quinlan Creek (1806D), and Camp Meeting Creek (1806A).

In 2002, segment 1806 was added to the 303(d) list of impaired waters due to bacteria levels above the screening criteria of 126 MPN/100 mL. Portions of segment 1806 contributing to the impairment were determined to be within the urbanized zones of the City of Kerrville. Subsequently, a total maximum daily loading (TMDL) plan was created by UGRA and TCEQ, which was approved by EPA in 2007. The plan aims to reduce bacteria loading through implementation of best management practices (BMPs) in the area. Local stakeholders, including Kerr County and the City of Kerrville, continue to partner with UGRA to implement best management practices first identified in the Bacteria Reduction Plan for the Upper Guadalupe River. More information on the plan can be found at: www.ugra.org/major-initiatives/bacteria-reduction-plan.

Segment 1806 above Flat Rock Dam and its tributaries are monitored by UGRA at nine stations. 1806 above Flat Rock Dam is no longer impaired for bacteria. TMDL implementation and lower than average rainfall, resulting in decreased runoff, could be contributing to the reduction of bacteria levels in this segment. However, three tributaries of segment 1806 are impaired for bacteria, including Camp Meeting Creek (1806A), Quinlan Creek (1806D), and Town Creek (1806E).

Total Maximum Daily Load (TMDL) studies conducted in Quinlan and Town creeks showed that unregulated storm water runoff and bacteria loading from wildlife and livestock are potential contributors to the elevated bacteria levels.

Station ID	Dissolved Oxygen	Biologicals	Bacteria	Temperature	Nutrients	Chlorophyll a
15111	M	I	M	M	M	M
12618	M	M	M	M	M	M
12616	M	M	M	M	M	M
12617	M	M	M	M	M	M
16243	M	M	M	M	M	M
16244	M	M	M	M	M	M
12615	M	M	M	M	M	M
12546	C	M	I	M	M	M
12541	M	M	I	M	M	M
12549	M	M	I	M	M	M

M - Meets water quality criteria

C - Concern for water quality criteria

I - Impaired for water quality criteria

Data analyses indicated that chloride levels significantly decreased over time at multiple sites throughout this segment. Chloride data from station 15111 is shown here (Figure 3). Analyses also showed decreasing sulfate (Figure 4) and nitrate (Figure 5) levels at station 12546. This could be due to annual rainfall amounts during the ten-year period which were mostly below average, leading to decreased surface runoff and reduced chloride and sulfate loading. Communities around Center Point in Kerr County recently transitioned from private septic systems to a public collection system for wastewater, which could also help reduce chloride, sulfate, and nitrate levels.

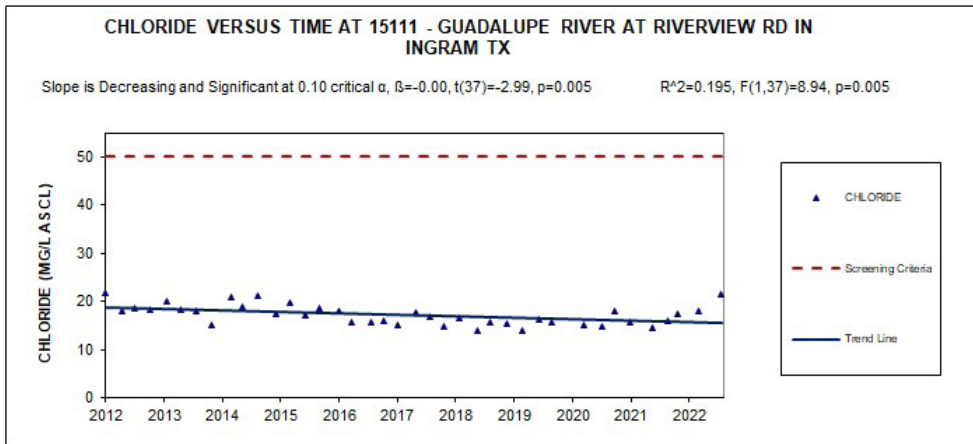


Figure 3: Chloride trend at Station 15111

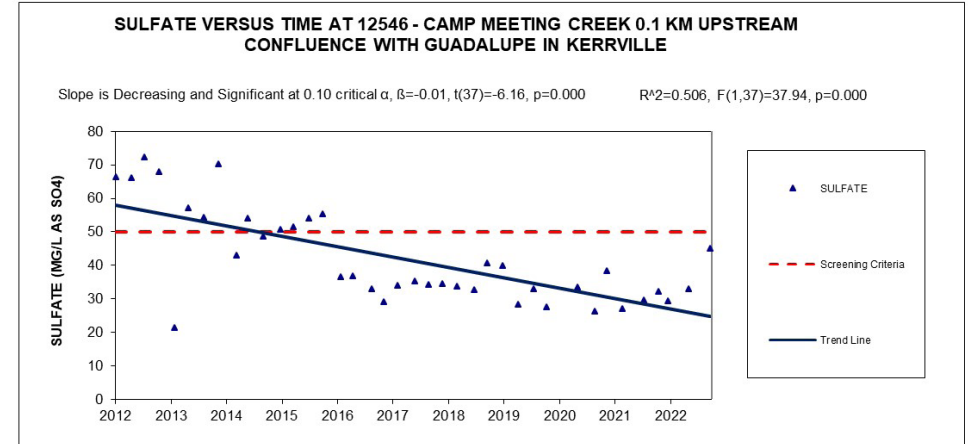


Figure 4: Sulfate trend at Station 12546

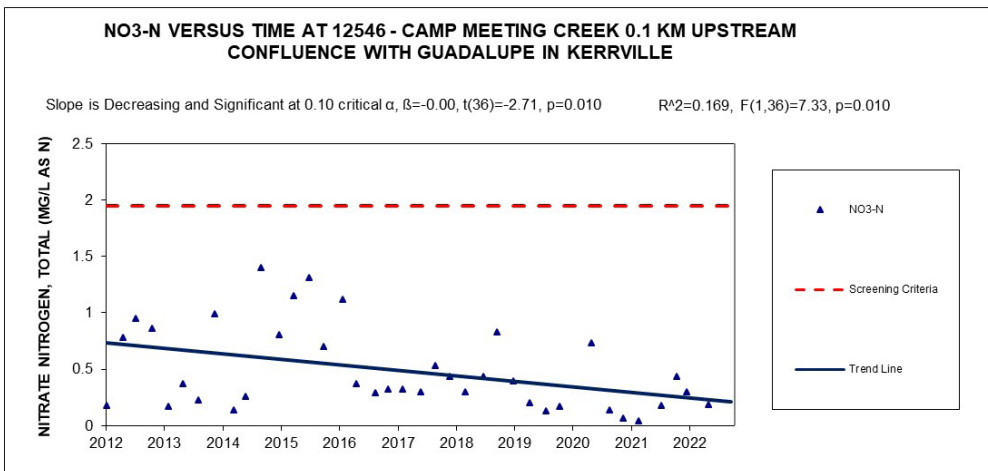


Figure 5: Nitrate trend at Station 12546