

ECOLOGICALLY UNIQUE STREAM SEGMENTS OF THE LOWER COLORADO REGIONAL WATER PLANNING AREA



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INTRODUCTION

Lower Colorado River Basin: Ecologically Unique River and Stream Segments

As a result of the passage of Senate Bill 1 in 1997, water planning in Texas became the province of regional planning groups rather than the Texas Water Development Board (TWDB). For the Lower Colorado River Basin, which extends from Mills County to Matagorda County (Figure 1), the Lower Colorado Regional Water Planning Group (LCRWPG) was established to plan for the next 50 years of water needs within the region. As a part of the planning process the regional groups may identify stream segments for designation as ecologically unique according to the process outlined in the Texas Administrative Code (TAC) Section 357 and the Texas Water Code (TWC) Section 16.051. In accordance with TWDB rules, criteria based on biological function, hydrologic function, riparian conservation areas, high water quality/exceptional aquatic life/high aesthetic value, and threatened or endangered species/unique communities were considered in evaluating a river or stream segment as being of unique ecological value (Appendix A).

In an effort to assist the regional planning groups in this endeavor, the TPWD put together a list of ecologically significant stream segments based on agency studies, data, and expertise (Appendix B). A stream that meets at least one of the criteria for being ecologically unique was considered by the TPWD to be significant. The LCRA also identified stream segments in the planning area that they considered to be of particular ecological importance (Appendix B). In addition, the Bastrop County Environmental Network (BCEN) recommended, and supported with documentation, the nomination of several stream segments in Bastrop County to ecologically unique status (Appendix B). And finally, the Region G Water Planning Group notified the LCRWPG about a stream segment that borders the Lower Colorado region that they were considering for designation as ecologically unique (Appendix B).

The Unique Stream Segments/Reservoir Sites Subcommittee deliberated and debated the relative merits of stream designation and potential legal ramifications. The subcommittee looked at the information presented by the TPWD, LCRA, BCEN, and Region G; and considered the comments gathered at the four public meetings; before recognizing nine stream segments as potentially ecologically unique (Table1).

Ultimately, the subcommittee adopted a resolution (Appendix C) that calls for legislative clarification on the possible impact of designation on property owners and local governments, further study on the nine identified stream segments, and a consensus for designation by affected landowners. This report provides background information on the

nine streams in the LCRWP region identified by the subcommittee as candidates for designation as ecologically unique.

Table 1. Stream segments identified by the LCRWPG Unique Stream Segments/Reservoir Sites Subcommittee as warranting further study for designation as ecologically unique.

| STREAM SEGMENT | LOCATION |
|---|---|
| Barton Springs segment of the Edwards Aquifer | Recharge stretches of Barton, Bear, Little Bear, Onion, Slaughter, and Williamson Creeks in Travis and Hays counties |
| Bull Creek | From the confluence with Lake Austin upstream to its headwaters in Travis County |
| Colorado River | Within TNRCC classified segments 1409 and 1410 including Gorman Creek in Burnet, Lampasas, and Mills counties |
| Colorado River | TNRCC classified segments 1428 and 1434 in Travis, Bastrop, and Fayette counties |
| Colorado River | TNRCC classified segment 1402 including Shaws Bend in Fayette, Colorado, Wharton, and Matagorda counties |
| Cummins Creek | From the confluence with the Colorado River upstream to FM 159 in Fayette County |
| Llano River | TNRCC classified segment 1415 from the confluence with Johnson Creek to CR 2768 near Castell in Llano County |
| Pedernales River | TNRCC classified segment 1415 in Kimball, Gillespie, Blanco, and Travis counties |
| Rocky Creek | From the confluence with the Lampasas River upstream to the union of North Rocky Creek and South Rocky Creek in Burnet County |

Barton Springs segment of the Edwards Aquifer including recharge zones of Barton, Bear, Little Bear, Onion, Slaughter, and Williamson Creeks:

Streams of the recharge area of the Barton Springs segment of the Edwards Aquifer are generally influenced by the interaction between groundwater and surface water and the physicochemical conditions of the karst Edwards Aquifer. Water quality is generally good to exceptional, although coliform levels are occasionally elevated after storm events. Nitrite levels can also be high due to the influence of groundwater (TNRCC 1995). Substrate is typically limestone bedrock and rubble, boulders, and gravel. The upper portions of the streams are generally intermittent, except in spring-fed reaches, which limits aquatic habitat. However, these portions of the stream can be important for aquifer recharge.

Barton Creek is TNRCC classified stream segment 1430 and extends from the confluence with Town Lake in Travis County to FM 12 in Hays County. The creek is in the Central Texas Plateau ecoregion and the watershed lies within the live oak-ashe juniper woods vegetation association as identified by McMahan et al. (1984). A comprehensive list of literature about the Barton Springs portion of the Edwards Aquifer was prepared by the City of Austin in collaboration with the Austin History Center and is available at <http://www.ci.austin.tx.us/aquifer/> (Austin, City of 2000). Barton Creek meets the following criteria for designation as ecologically unique:

*Riparian Conservation Area: the lower end of the stream is in the City of Austin's Zilker Park;

*High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: the stream was selected as an ecoregion stream based on its physical attributes, water quality, and biological assemblages; the stream exhibits high dissolved oxygen concentrations and a diverse and complex benthic macroinvertebrate community (Bayer et al. 1992); and

*Endangered/Threatened Species: the stream contains the only known population of the Barton Springs salamander (*Eurycea sosorum*), a federally listed endangered species.

Bull Creek from the confluence with Lake Austin upstream to its headwaters

Bull Creek lies wholly within Travis County in the northwest portion of the City of Austin. The watershed for the stream is approximately 32 square miles in a rapidly developing area. The watershed is located on the eastern edge of the Texas Hill Country and immediately west of the Balcones Fault Zone. Numerous seeps and springs provide baseflow to Bull Creek. Water quality is generally good, although some degradation has occurred due to development. The Bull Creek watershed contains suitable habitat for a variety of rare and endangered species including the golden-cheeked warbler (*Dendroica chrysoparia*), black-capped vireo (*Vireo atricapillus*), Tooth Cave spider (*Neoleptoneta myopica*), Tooth Cave pseudoscorpion (*Tartarocreagris texana*), Bee Creek Cave harvestman (*Texella redelli*), Bone Cave harvestman (*Texella redelli*), Tooth Cave ground beetle (*Rhadine persephone*), Kretschmarr Cave mold beetle (*Texamauropis reddeli*), and Jollyville Plateau salamander (*Eurycea* sp.). In addition, the watershed contains a very diverse flora (Austin, City of 1993, 2000).

Bull Creek meets the following criteria for designation as ecologically unique:

- *Biologic Function: nearly pristine stream with a largely intact riparian area;
- *Hydrologic Function: pervious cover and intact riparian zone reduce downstream flooding;
- *Riparian Conservation Area: Bull Creek Preserve;
- *High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: overall pristine nature gives the stream a high aesthetic value; stream has a diverse and complex benthic macroinvertebrate community, and an abundance and diversity of amphibians; and
- *Endangered/Threatened Species: the stream contains a population of the Jollyville Plateau salamander (*Eurycea* sp.), a federally listed endangered species.

Colorado River within TNRCC classified segments 1409 and 1410 including Gorman Creek in Burnet, Lampasas, and Mills counties

This segment consists primarily of the Colorado River upstream of Lake Buchanan to the Brown, San Saba, and Mills County line, but also includes the Gorman Creek tributary. The stream segment is within the Central Texas Plateau ecoregion. Vegetation types common along the stream are mostly live oak-juniper parks (McMahan et al. 1984). The river itself is wide and relatively shallow, flowing over a bed of limestone and gravel. A few small rapids exist on the upper part of this section down to the point where the backwaters of Lake Buchanan deepen the river and slow its flow.

Among the segment's scenic attributes are high limestone bluffs, vistas of rugged cedar-covered hills, and the existence of one of the most spectacular waterfalls in Texas. Gorman Falls is formed at the point where Gorman Creek tumbles into the Colorado over a 75 foot tall limestone bluff. The water coming from the creek is clear and cold, and many ferns and mosses grow on the slippery rocks and travertine deposits below the falls (TPWD 1979). The TNRCC (1995) identifies the segment as having a high aquatic life use. The National Park Service (1995) identified the segment for inclusion in the National Rivers Inventory based on the degree to which the river is free-flowing, the degree to which the river and corridor is undeveloped, and the outstanding natural and cultural characteristics of the river and its immediate environment. The segment meets the following criteria for designation as ecologically unique:

*Biologic Function: white bass spawning area (Bauer et al. 1991);

*Riparian Conservation Area: Colorado Bend State Park;

*High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: exceptional aesthetic value; and

*Endangered/Threatened Species: Concho water snake (*Nerodia paucimaculata*), a federal and state listed endangered species; and the rare and endemic mollusks Texas fawnfoot and Texas pimpleback (Howells 1999).

Colorado River within TNRCC classified segments 1428 and 1434 in Travis, Bastrop, and Fayette counties

The segment includes the Colorado River from a point 100 meters downstream of SH 71 in La Grange to Longhorn Dam in Austin and portions of Wilbarger, Big Sandy, Alum, and Cedar creeks in Bastrop County. Extensive information about the segment in Bastrop County, submitted by the Bastrop County Environmental Network, is presented in Appendix B. In general, water levels in the Colorado River are controlled by releases from Lake Travis and Lake Buchanan. Low flows often depend on return flows from the City of Austin. Stream flow in the smaller creeks in Bastrop County originates from diffuse surface water runoff, groundwater contributions, and springs. The segment lies within the Texas Blackland Prairies ecoregion. Substrate in the streams is typically sand and/or gravel. Several reaches of the segment are characterized by rubble and boulder fields. The TNRCC (1995) has classified the mainstem river as supportive of exceptional aquatic life uses. Water quality is generally good, although nutrient levels are often elevated. Water quality in the creeks is typically good, but influenced by flow levels, land use patterns, and wastewater discharges. Cedar Creek contains an exceptional macroinvertebrate community and, based on the ichthyofauna, a high Index of Biotic Integrity rating (LCRA 2000). This portion of the Colorado River has a diverse fish community, including the state-listed as threatened Blue Sucker (*Cycleptus elongatus*). In addition, the state and federally-listed as endangered Houston toad (*Bufo houstonensis*) occurs in the area. The segment meets the following criteria for designation as ecologically unique:

*Biologic Function: undeveloped riverine habitat, part of the Central Flyway of migratory birds;

*Hydrologic function: extensive riparian zone attenuates flooding and improves water quality via filtration and soil stabilization; riparian and stream channels hydrologically connected to alluvial aquifer and Carrizo-Wilcox aquifer (LCRA 2000)

*Riparian Conservation Area: McKinney Roughs Environmental Learning Center;

*High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: exceptional aquatic life use (TNRCC 1995); and

*Endangered/Threatened Species: Blue sucker (*Cyclepus elongatus*), a state-listed endangered species; and the federal and state-listed as endangered Houston toad (*Bufo houstonensis*).

Colorado River within TNRCC classified segment 1402 including Shaws Bend in Fayette, Colorado, Wharton, and Matagorda counties

The segment extends from just downstream of the Missouri-Pacific railroad trestle in Matagorda County to a point 100 meters downstream of SH 71 in La Grange, a distance of 150 miles. The segment lies within the Texas Blackland Prairies ecoregion and flows into the East Central Texas Plains ecoregion. Substrate varies from primarily gravel in the upper reaches of the segment to gravel/cobble riffles and extensive sand dominated reaches downstream (Mosier and Ray 1992). Stream flow is largely dependent on upstream releases for rice irrigation, but also receives contributions from the intervening watershed. The water quality of the segment is typically good, and supports a high aquatic life use designation. Nutrient levels are elevated, but dissolved oxygen concentrations are typically higher than the minimum required to maintain a high aquatic life use designation (TNRCC 1995). The fish community is generally diverse and includes the Blue sucker (*Cycleptus elongatus*), a state-listed endangered species. Although not contained in this report, additional information about the segment is available in feasibility studies for Shaw's Bend Reservoir. The segment meets the following criteria for designation as ecologically unique:

*Biologic Function: undeveloped riverine habitat, part of the Central Flyway of migratory birds; and

*Endangered/Threatened Species: Blue sucker (*Cyclepus elongatus*), a state-listed endangered species.

Cummins Creek from the confluence with the Colorado River in Colorado County upstream to FM 159 in Fayette County

Cummins Creek lies within the Texas Blacklands Prairie ecoregion in Colorado and Fayette Counties. The stream is characterized by shallow to moderately deep pools, riffles, and occasional shallow runs. Substrate is predominantly fine sands with gravel and rubble in riffles and runs. Cummins Creek is within the post oak savannah vegetation region (McMahan et al. 1984). The surrounding land use is mostly agricultural. Water quality is generally good, and the stream supports diverse macroinvertebrate and fish communities. The LCRA (2000) rated the creek, which has at least 27 species of fish, as suitable for a high aquatic life use for fish. Guadalupe bass (*Micropterus treculi*) have been collected in the stream. Cummins Creek supports at least 28 species of aquatic macroinvertebrates. Several varieties of mayflies and caddisflies, which are considered intolerant of pollution, are present. Cummins Creek rated an excellent aquatic life use category for macroinvertebrates based on work by the LCRA (2000). The segment meets the following criteria for designation as ecologically unique:

*High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: the stream was selected as an ecoregion stream based on its physical attributes, water quality, and biological assemblages; the stream exhibits high dissolved oxygen concentrations and a diverse and complex benthic macroinvertebrate community (Bayer et al. 1992, LCRA 2000).

Llano River within TNRCC classified segment 1415 from the confluence with Johnson Creek to CR 2768 near Castell in Llano County

The Llano River between the confluence with Johnson Creek and CR 2768 in Llano County is part of TNRCC classified stream segment 1415. The Llano River is a spring-fed stream of the Edwards Plateau and is widely known for its scenic beauty. It is in the Central Texas Plateau ecoregion and is characterized by the live oak-mesquite parks vegetation type (McMahan et al. 1984). Riparian vegetation includes elm, willow, sycamore, and salt-cedar. The stream has designated water uses for contact recreation, as a public water supply, and for high aquatic life uses (TNRCC 1995). Among the fish found in the stream is the Guadalupe bass (*Micropterus treculi*). The substrate is composed of limestone bedrock and gravel. In addition, large boulders and slabs of granite and gneiss occur in the river. This section of the Llano River is widely known for the one-billion year old igneous and metamorphic rocks which form the riverbed. The area is a part of the Llano Uplift, which is one of the most unique geologic features in Texas (TPWD 1979). Land use along the stream is generally rural and includes ranching and agriculture. The segment meets the following criteria for designation as ecologically unique:

*High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: exceptional aesthetic value.

Pedernales River within TNRCC classified segment 1415 in Kimball, Gillespie, Blanco, and Travis counties

The Pedernales River from a point immediately upstream of the confluence of Fall Creek in Travis County upstream to FM 385 in Kimble County makes up TNRCC classified stream segment 1415. Most of this segment lies within the Lower Colorado Regional Water Planning area. The Pedernales River in general has high water quality and supports a high aquatic life use (TNRCC 1995). The stream is within the Central Texas Plateau ecoregion. Surrounding vegetation is characteristic of the live oak-ashe juniper parks and live oak-mesquite-ashe juniper parks vegetation regions (McMahan et al. 1984). The river is spring-fed and free-flowing with many limestone outcroppings. The National Park Service (1995) identified the segment for inclusion in the National Rivers Inventory based on the degree to which the river is free-flowing, the degree to which the river and corridor is undeveloped, and the outstanding natural and cultural characteristics of the river and its immediate environment. Bald cypress, red columbine, and native orchids are found adjacent to the river (TPWD 1979). Among the fish species that occur in the stream is the Guadalupe bass (*Micropterus treculi*). Other aquatic species typical of Hill Country, spring-fed streams also inhabit the Pedernales River. Along the river are several state and national parks including Pedernales Falls State Park, LBJ State Park, and LBJ National Park. The segment meets the following criteria for designation as ecologically unique:

*Biologic Function: significant natural area;

*Riparian Conservation Area: Pedernales Falls State Park, LBJ State Park, LBJ National Park, and Stonewall Park; and

*High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: exceptional aesthetic value.

Rocky Creek From the confluence with the Lampasas River upstream to the union of North Rocky Creek and South Rocky Creek in Burnet County

Rocky Creek lies within the Brazos River Basin in northeast Burnet County. The stream is approximately 6 miles long with a drainage area of 94 square miles. The stream is in the Central Texas Plateau ecoregion and within the oak-mesquite-juniper parks/woods vegetation association (McMahan et al. 1984). The upper reach flows through the live oak-ashe juniper parks association. Long deep runs with numerous short riffles and occasional deep glides characterize creek morphology. Limestone bedrock, gravel, and rubble are the dominant substrate types. In sampling for the Texas Aquatic Ecoregion Project, 54 species of aquatic invertebrates and 15 species of fish were collected (Bayer et al. 1992). The segment meets the following criteria for designation as ecologically unique:

*High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: the stream was selected as an ecoregion stream based on its physical attributes, water quality, and biological assemblages; the stream exhibits high dissolved oxygen concentrations and a diverse and complex fish and benthic macroinvertebrate community (Bayer et al. 1992).

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A comprehensive list of literature about the Barton Springs portion of the Edwards Aquifer was prepared by the City of Austin in collaboration with the Austin History Center and is available at <http://www.ci.austin.tx.us/aquifer/>. A partial list of existing information obtained from this website is given in Appendix C (Austin, City of 2000).

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In accordance with the Texas Administrative Code 31 §357.8, the following criteria are to be used when identifying a river or stream segment as being of unique ecological value:

- **Biological Function:** Segments which display significant overall habitat value including both quantity and quality considering the degree of biodiversity, age, and uniqueness observed and including terrestrial, wetland, aquatic, or estuarine habitats;
- **Hydrologic Function:** Segments which are fringed by habitats that perform valuable hydrologic functions relating to water quality, flood attenuation, flow stabilization, or groundwater recharge and discharge;
- **Riparian Conservation Areas:** Segments which are fringed by significant areas in public ownership including state and federal refuges, wildlife management areas, preserves, parks, mitigation areas, or other areas held by governmental organizations for conservation purposes under a governmentally approved conservation plan;
- **High Water Quality/Exceptional Aquatic Life/High Aesthetic Value:** Segments and spring resources that are significant due to unique or critical habitats and exceptional aquatic life uses dependent on or associated with high water quality; or
- **Threatened or Endangered Species/Unique Communities:** Sites along segments where water development projects would have significant detrimental effects on state or federally listed threatened and endangered species, and sites along segments that are significant due to the presence of unique, exemplary, or unusually extensive natural communities.