



# Fish of the Blanco River Basin

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Many of the ecosystems in the Blanco River Basin have remained relatively intact and minimally impacted. However, fish assemblages are an exception to this trend and have experienced significant negative impact by human driven changes.

## Habitat Loss

Preservation of the Blanco River ecosystem is dependent upon maintaining water quality and flow conditions that are optimal for endemic fishes. Drastic changes resulting from urbanization could introduce factors that impact fish communities as habitats change.

In the past, the decline of southern native fish populations have been primarily due to habitat degradation<sup>1</sup>. Impacts from stormwater run-off, urban contamination loads, and erosion increase sediment and nutrient loads. Deposition of excessive siltation alters depth and substrate characteristics on which specific riparian species depend.

Range restriction of these species from dam construction have altered hydrologic regimes resulting in the following:

- Declining fish numbers
- Reduced connectivity between upstream and downstream river stretches affecting reproduction and feeding<sup>2</sup>
- Restricted movement of fishes resulting in reduced upstream biodiversity
- Decreased periodic discharge of floods in lower river segments important in cyclical ecological disturbances
- Create opportunities for dominance of species associated with lake (lentic) systems

Along with the threat of introduced species, increased predation, competition, and disease are factors that could continue to severely impact fish populations associated with the higher velocity runs and riffles of the Blanco River.

## Importance of Natural Flow

Patterns in abundance and associated habitat in the Blanco River have been studied with minnows (*cyprinids*) comprising 78% of the overall fish assemblage<sup>3</sup>. Study sites along the river

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<sup>1</sup> Warren, M.L., Jr., B.M. Burr, S.J. Walsh, H.I. Bart, Jr., R.C. Cashner, D.A. Etnier, B.J. Freeman, B.R. Kuhajda, R.L. Maden, H.W. Robinson, S.T. Ross, and W.C. Starnes. 2000. Diversity, Distribution, and Conservation Status of the Native Freshwater Fishes of the Southern United States. *Fisheries*. Vol 25:7-31.

<sup>2</sup> Porto, L.M., R.L. McLaughlin, and D.L.G. Noakes. 1999. Low Headed barrier Dams Restrict the Movement of Fishes in Two Lake Ontario Streams. *North American Journal of Fisheries Management*: Vol 19:1028-1036.



(figure 23) found different fish species preferred physical habitat dependent upon flow, depth, and substrate (table 6).

Assemblages occurring in dam impoundments are dominated by bass fish and sunfish (*centrarchids*) in habitats with lower flow velocities and more silt and blue-green filamentous algae, whereas percids were more abundant in shallow riffle habitat. The *centrarchids* include hybridized bass - a species that causes further stress to the threatened Guadalupe Bass.

Impoundments also impact obligate fluvial specialist species that thrive in fast-moving waters leading to extirpation and replacement with assemblages of habitat generalists and typically non-native species<sup>3</sup>.

Table 6 Fishes collected from the Blanco River in 2004 (Bonner, un-published data).

Common name	Scientific name	Sites								Little Blanco River	Cypress Creek	
		1	2	3	4	5	6	7	8			
spotted gar	<i>Lepisosteus oculatus</i>				<0.1	<0.1						
central stoneroller	<i>Campestris anomalum</i>	9.9		3.9	11	0.3	1	6.5	2.9	0.6	15.5	
blacktail shiner	<i>Cyprinella venusta</i>	77	37.2	31.5	38.5	56.2	41.9	68.1	29.4	3.6	34.6	
common carp	<i>Cyprinus carpio</i> (I)		0.1		<0.1							
Guadalupe roundnose minnow	<i>Dionda nigrotaneniata</i>									4.5	0.4	
burthead chub	<i>Macrhybopsis marconis</i>								0.1			
Texas shiner	<i>Notropis amabilis</i>	2.1	18.5	36.7	16.7	11.9	0.3	5.9	29.4	2.2	17.1	
sand shiner	<i>Notropis stramineus</i>					18.1	5	0.1				
mimic shiner	<i>Notropis volucellus</i>				1.9	4.7	2	8.8	15.8			
fathead minnow	<i>Pimephales promelas</i> (I)						0.1					
bullhead minnow	<i>Pimephales vigilax</i>		11.5		0.6							
gray redbreast	<i>Moxostoma congestum</i>		3.2	0.2	0.1						0.5	
Mexican tetra	<i>Astyanax mexicanus</i> (I)							0.1	0.2			
yellow bullhead	<i>Ameiurus natalis</i>										0.2	
channel catfish	<i>Ictalurus punctatus</i>	0.5	0.2	0.8		0.2	0.5	0.1	0.1			
flathead catfish	<i>Pylodictis olivaris</i>					<0.1						
blackstripe minnow	<i>Fundulus notatus</i>							1.2	0.2			
western mosquitofish	<i>Gambusia affinis</i>	4.5	6.1	0.5	19.4	4.1	39.3	0.8	9.3	22.3	6.4	
redbreast sunfish	<i>Lepomis auritus</i> (I)	2.2	8.9	13.9	3.7	1.8	1.2	2.3	2.2	16.5	14.1	
green sunfish	<i>Lepomis cyanellus</i>	0.1	0.2	1.8		0.1		0.1		5.1		
warmouth	<i>Lepomis gulosus</i>	0.1	0.1								0.1	
bluegill	<i>Lepomis macrochirus</i>	1.1	8.6	0.2		0.4		0.4	2	26.9		
longear sunfish	<i>Lepomis megalotis</i>	1.9	0.5	6.8	6.2	0.9	0.2	0.1	0.3	3.4	2.7	
redeer sunfish	<i>Lepomis microlophus</i>		0.1	0.3						0.3		
western spotted sunfish	<i>Lepomis miniatus</i>						<0.1					
sunfish (juvenile)	<i>Lepomis</i> sp.	0.3	3.8	0.7	0.9	0.1	0.6	0.1	0.2	2	0.7	
smallmouth bass	<i>Micropterus dolomieu</i> (I)			0.2		0.4	0.1			0.1	0.5	
largemouth bass	<i>Micropterus salmoides</i>	0.4	1	0.7	0.6					4.7	0.1	
Guadalupe bass	<i>Micropterus troculi</i>			0.4					0.2			
orangethroat darter	<i>Etheostoma spectabile</i>					0.4	5.6	3.7	3.3	7.6	3.4	
Texas logperch	<i>Percina carbonaria</i>				0.2			0.1	0.2	0.1		
dusky darter	<i>Percina sciera</i>									0.1		
Rio Grande cichlid	<i>Cichlosoma cyanoguttatum</i> (I)		0.2	1.3		0.4	2	1.7	4.1		3.6	
	Total number of individuals	2,528	1,106	1,092	806	1,593	2,031	1,922	2,656	685	843	
Mesohabitat	% riffle			17			29	26	13	5	41	
	% run	100		23	84	100	65	56	44	44	44	
	% pool		100	47	16			17	38	49	11	
	% backwater			13			6		5	2	3	
Substrate	% gravel	2		19	4	27	35	38	38	74	1	
	% cobble	2		41	5	13	3	6	52	14	22	
	% bedrock	70	50	13	91	60	49	28	1		47	
	% silt	26	50	26			5	28	10	1	8	
	% detritus			2			9			11	23	
Cover	% LWD	<1		2		2	3	1	4	2	4	
	% veg	5.3	30	10	11	1	3	19	26	14	7	
	% boulder	<1		<1	3	2			<1	2	1	

<sup>3</sup> Bean, P. T., T. H. Bonner, and B. M. Littrell. 2007. Spatial and temporal patterns in the fish assemblage of the Blanco River, Texas. Texas Journal of Science: Vol 59:179-200.



Figure 23 Major Fish Assemblage Locations in Blanco Basin

## Relative Abundance

A study conducted by Dr. T Bonner (Texas State University) between 2003 and 2004, resulted in the collection of 15,262 total fishes from 10 families, 20 genera, and 32 species (Table 6).

Spatial and temporal abundances reported included:

- *Cyprinella venusta* (blacktail shiner) (47% relative abundance)
- *Notropis amabilis* (Texas shiner) (13%)
- *Gambusia affinis* (western mosquitofish) (11%)
- *Camptostoma anomalum* (central stoneroller) (4.9%)
- *Lepomis auritus* (redbreast sunfish) (4.7%)
- *Notropis volucellus* (mimic shiner) (4.7%)

Among the 32 species, six species are non-native to the Guadalupe River drainage (see table 6).

One species is endemic to the Guadalupe River drainage:

- *Dionda nigrotaneniata* (Guadalupe roundnose minnow)

4 species are endemic to drainage systems in Texas:

- *Macrhybopsis marconis* (burrhead chub)
- *Moxostoma congestum* (gray redbhorse)
- *Micropterus treculi* (Guadalupe bass)



- *Percina carbonaria* (Texas logperch)

Two species were not collected but had been previously reported in the Blanco River:

- *Anguilla rostrata* (American eel) and
- *Ictalurus lupus* (headwater catfish)

According to angler reports, the American Eel is still found in the Blanco River. The Headwater Catfish has been reported as completely absent from the Guadalupe River drainage. (TNC Report - Bonner and Littrell 2005).

## Distribution

According to this study, fish assemblages are not evenly distributed throughout the Blanco River. Spatially, species richness and abundance among sites mean similarity index was 51% (Renkonen Similarity Index). Alike to the findings reported by Bean et al.<sup>3</sup>, the most abundant group of fishes sampled were generally minnows (*cyprinids*) in Cypress Creek and mainstem sites. Bass and sunfish (*Centrarchids*) are more abundant in the Little Blanco River.

Sampling results in the lower Blanco River yielded 11 species not present in the upper mainstem. As a natural barrier, one narrow, shallow sampling site may limit movement upstream of some fishes such as the Orangethroat Darter (*Etheostoma spectabile*) and mimic shiner. Other fishes such as *Astyanax mexicanus*, *Macrhybopsis marconis*, and *Fundulus notatus* may have been blocked from moving upstream from because of the low-headed Five Mile Dam.

## Threatened Species

The Texas Parks and Wildlife Department lists the Guadalupe Bass as a species of concern, as its habitat and range are diminishing due primarily to impoundment and to a lesser extent by decreasing water quality<sup>4</sup>. This fish species is also impacted by hybridization with smallmouth bass, and is endemic to the Edwards Plateau. It be found throughout the four counties that comprise the Blanco River Basin (portions of Blanco, Comal, Hays and Kendall counties) as well as in surrounding counties (figure 24). Again, managing habitat and water quality in the basin are critical for the management of this species.

Increasing construction of small dams and impoundments and other development will continue pressure on the Guadalupe Bass. The rare Guadalupe Darter and Headwater Catfish also have narrow habitat ranges that are continuously diminishing with increasing urbanization and changing land use patterns. Additionally, these species are also affected by the introduction of non-native and invasive fishes. Their known habitat ranges and suitability within the basin are reported in Table 7.

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<sup>4</sup> Texas Parks and Wildlife. No Date. Rare, Threatened, and Endangered Species of Texas. <http://gis.tpwd.state.tx.us/TpwEndangeredSpecies/DesktopDefault.aspx> (Accessed December 02, 2010).



Figure 24 Potential or Known Presence of Threatened Guadalupe Bass

Table 7 Threatened, Endangered and Rare Fish.

Common Name	Habitat Description	Location within Basin
Guadalupe bass	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system	Blanco, Comal, Hays, Kendall
Guadalupe darter	Guadalupe River basin; most common over gravel or gravel and sand raceways of large streams and rivers	Comal, Hays, Kendall
Headwater catfish	Originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers	Blanco, Kendall