

Fish Community Monitoring as part of the Trinity River Authority's Clean Rivers Program

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Abstract

With only four species of fish collected in the Dallas Fort Worth Metroplex as recently as the 1970's, it is no surprise that the Trinity River was once referred to as the "mythological river of death". Since then, coordinated improvements in water quality have led to the recovery of fish assemblages within the Trinity, becoming a well-documented environmental success story. To monitor that recovery, the Trinity River Authority has conducted Aquatic Life Monitoring surveys on one or more Trinity Basin waterbodies biannually since 2013. These surveys have targeted waterbodies with documented concerns or impairments for one or more water quality parameters, capturing conditions in both the Index (March 15-Oct 15) and Critical (July 1-Sept 30) periods. At each site, whole community fish data was collected via backpack electrofishing and seine netting, alongside benthic macroinvertebrate and habitat data. As of 2023, 28 surveys have been conducted on 13 waterbodies throughout the Upper Trinity basin. Although these surveys have targeted streams with water quality concerns, 90% of sites have scored as either High or Exceptional on the State of Texas Regionalized Nekton Index of Biotic Integrity. Here we will characterize the collected fish communities with over 11,900 individuals from 41 unique species collected during these surveys, while also describing the vision of the program over the next decade.

Background and Methods

- Nicknamed "Mythological River of Death" by Texas Department of Health in 1925 report
- TPWD Surveys in 1970's showed few species in the Trinity (Figure 1).

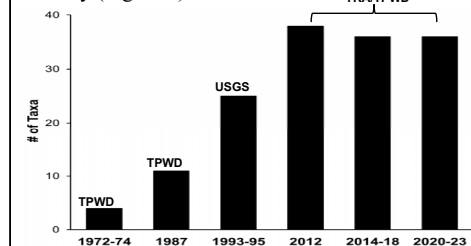


Figure 1: Increasing number of fish taxa over time from surveys in South Dallas County, TX.

- Texas Clean Rivers Act (1991) passed to address water resource issues holistically, now referred to as the Texas Clean Rivers Program (CRP).

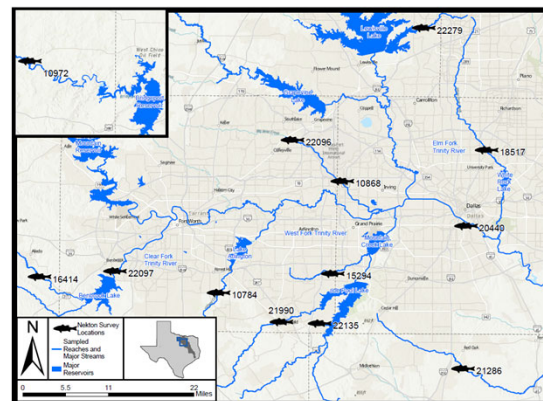
Purpose of CRP Bio-monitoring Program:

To determine if the Texas Surface Water Quality Standards are being attained within the Trinity River basin, using state-wide standardized survey protocols for fish, macro-invertebrates, and instream/riparian habitat.

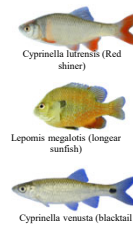
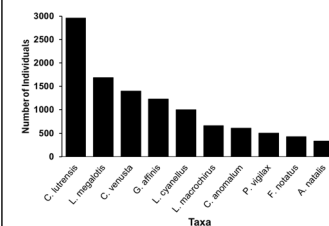
Standardized Methods:

- Reach Length:** 40x the Average Wetted Width of the Stream (up to 500 meters)
- Ideal Locations:** Possess Riffle, Run, Pool complex (when possible)
- Nekton Surveys:**
 - Min 900 seconds of Electrofishing
 - Min 6 Seine hauls for a minimum of 60 meters
- Habitat Surveys:**
- SWQM Procedures Vol 2 _____

SWQM Station	Station Description	Non-Critical Period Survey	Non-Critical Period Nekton Score	Non-Critical Period Habitat Score	Critical Period Survey	Critical Period Nekton Score	Critical Period Habitat Score
16414	Clear Fork Trinity River at Kelly Rd.	6/27/2013 habitat, 6/28/2013 nekton/benthics	37	Intermediate	8/12/2013	48	Intermediate
10868	Bear Creek at Valley View Lane	6/27/2013 habitat, 6/28/2013 nekton/benthics	39	Intermediate	8/23/2013 habitat/nekton, 8/22/2013 benthics	46	Intermediate
21286	Red Oak Creek downstream of ROCRWS	6/20/2014 habitat, 7/9/2014 nekton/benthics	46	High	9/2/2014 habitat/benthics, 9/3/2014 nekton	44	High
10784	Village Creek upstream of Shelby Road	10/3/2016 habitat/benthics, 10/4/2016 nekton	50	Exceptional	8/9/2016 habitat/benthics, 8/10/2016 nekton	50	Intermediate
21990	Walnut Creek at Katherine Rose Park	5/31/2017	46	High	8/1/2017	39	High
15294	Fish Creek at Great Southwest Parkway	6/15/2018	48	High	7/23/2018	48	High
18517	White Rock Creek at Greenville Avenue	6/20/2018	50	Exceptional	7/24/2018	54	Exceptional
10972	West Fork Trinity River at SH 59	6/21/2018	50	Exceptional	8/1/2018	50	Exceptional
20440	Cedar Creek downstream of East 8th Street	10/1/2019	50	Exceptional	8/29/2019	48	High
22097	Clear Fork Trinity River at Trinity Trails footbridge	10/2/2019	52	Exceptional	8/30/2019	56	Exceptional
22096	Big Bear Creek at Parr Park	10/1/2020	44	High	8/13/2020	50	Exceptional
22135	Low Branch at South Holland Road	7/12/2021	46	High	8/13/2021	42	High
22279	Stewart Creek at south end of Teel Parkway	6/16/2022	44	High	7/21/2022 habitat/benthics, 7/22/2022 nekton	44	High
15294	Fish Creek at Great Southwest Parkway	6/30/2023 habitat/nekton, 6/29/2023 benthics	48	High	8/11/2023 habitat/nekton, 8/9/2023 benthics	50	Exceptional
10868	Bear Creek at Valley View Lane	6/25/2024	46	High	8/9/2024	46	High



10 Taxa make up 90% of species surveyed



Individual Tolerance

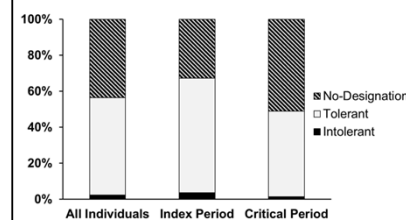


Figure 4: Most individuals sampled are categorized as pollution tolerant or have no-tolerance designation.

IBI Scores by Survey Period

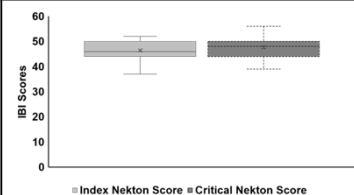
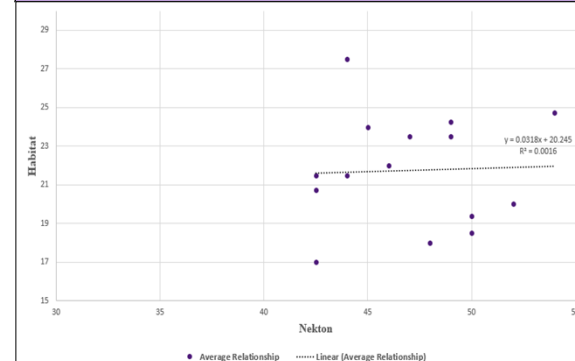


Figure 6: Regionalized Nekton IBI scores average to the High Aquatic Life Use designation did not differ by sampling period. (T.test, p=0.301)

Habitat and Nekton Relationship



Discussion & Conclusions

- The Trinity River has significantly improved since the Texas Department of Health labeled it the "Mythological River of Death" in the 1920's.
- Species diversity has remained steady since 2012.
- The Clean Rivers Program has been a driving factor in the restoration of habitat and species biodiversity in the Trinity River.
- Urban pollution remains the number one source of pollution entering the Trinity River.
- Continued monitoring and biological sampling is crucial to ensuring the river safe for humans and animals as a resource.

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