

Abstract

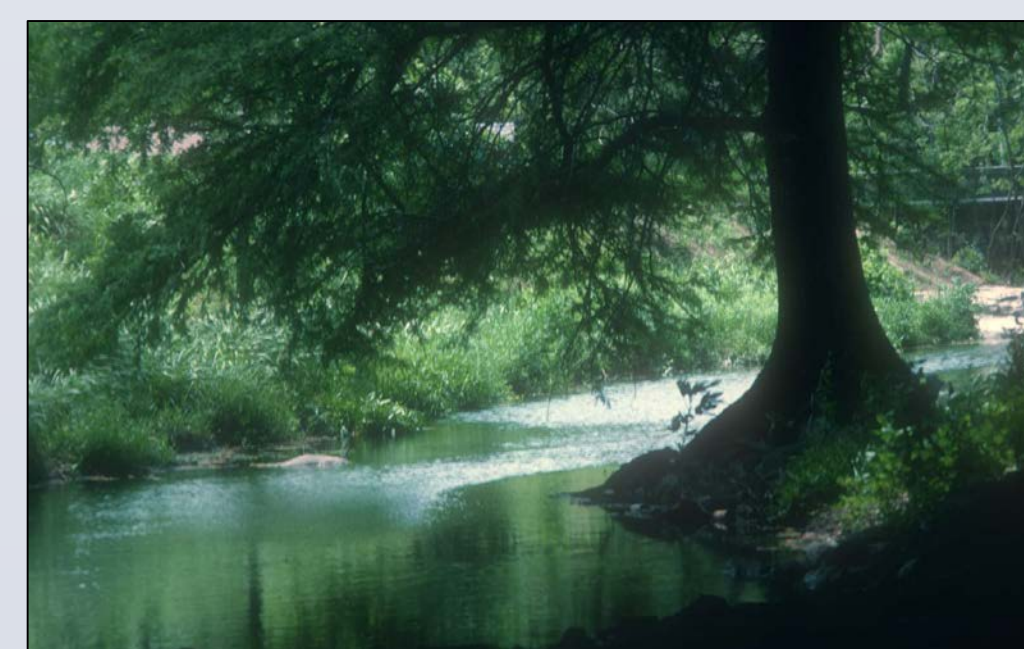
Waller Creek is an entirely urban creek flowing 11km through Austin, Travis County, Texas into Ladybird Lake. We gather the historic fish data, all held in our own Fishes of Texas Project database (Hendrickson and Cohen, 2018), for the creek and attempt to describe temporal change in the fauna of the creek. Minimal samples exist from the 1940's and '50s, but it's fish fauna is rigorously sampled in the 1970's when Edwards (1976) first formally surveyed the creek. It was uncollected in the 1980s. The Hendrickson lab, working with the public, local schools and universities, began sampling the creek in the 1990's and continues to do so. These two sources (Edwards and Hendrickson Lab) are the main generators of data and we compared pre- and post-1980s data largely generated by these two sources. The fish fauna remains dominated by the same seven species Edwards collected in the 1970s (*Gambusia affinis*, *Camptostoma anomalum*, *Astyanax mexicanus*, *Lepomis megalotis*, *Lepomis cyanellus*, *Cyprinella lutrensis*, and *Herichthys cyanoguttatus*), with the exception of an invasive species (*Xiphophorus variatus*), first detected in 2004, that is now the dominant species in the creek. Two of these seven species are firmly established non-natives (*Astyanax mexicanus* and *Herichthys cyanoguttatus*). Most of the less common native species collected in the 1970's are no longer present (*Ameiurus melas*, *Dionda flavipinnis*, *Fundulus zebrinus*, *Lepomis humilis*, *Lepomis macrochirus*) or rare (*Cyprinella venusta*, *Micropterus salmoides*, *Pimephales promelas*) based on the data.

Methods: Data Collection and Assembly

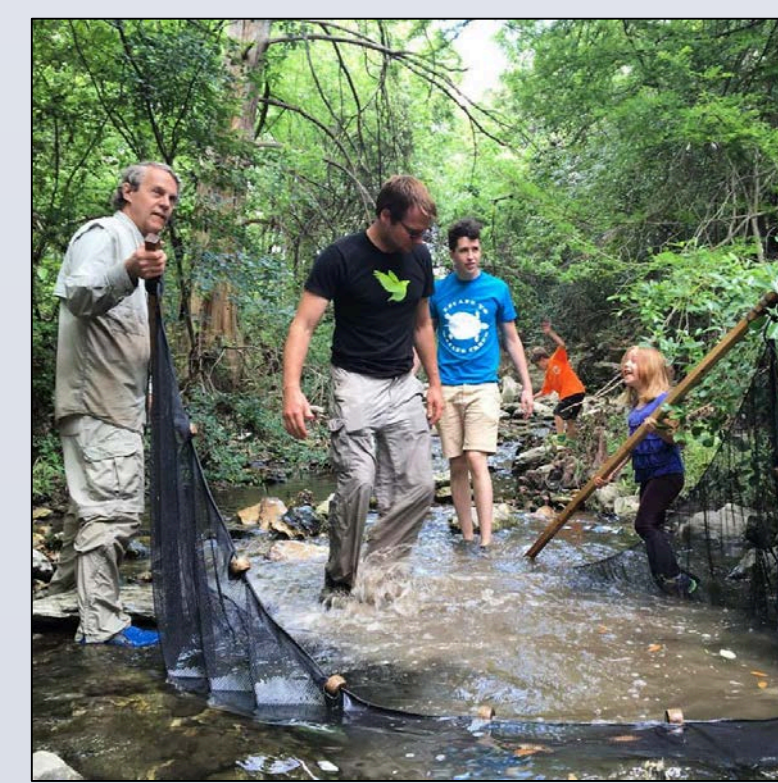
In the 1970's, as part of his Masters thesis (Edwards, 1976), Dr. Robert Edwards surveyed the creek's fishes using primarily minnow traps, providing a valuable baseline dataset. In the early 1990s the Hendrickson lab began sampling and continues to occasionally survey the creek and depositing specimens in the University of Texas Biodiversity Collections. All of these data are now available online in the Hendrickson Lab's Fishes of Texas Project (FoTX, www.fishesoftexas.org).

FoTX aims to gather and provide online quality controlled occurrence data for all of Texas' fish species. While the project's primary data source is museum specimens, which are verifiable via examination, the project has recently started gathering data from numerous non-specimen-based sources, including literature, agency databases, and citizen science sources (e.g. iNaturalist). This poster summarizes all available data (as of April 2018) for occurrences of fishes in Waller Creek.

The Hendrickson Lab has contributed now 64% of the total fish occurrence data from Waller Creek, via collections that were usually done in conjunction with members of the public or with students in local schools and universities, illustrating the important past and potential future role of the creek in environmental education and student research.



Waller Creek at near 24th street (1970s)



Waller Creek at Clark Field (2016), sampling fishes during bioblitz event

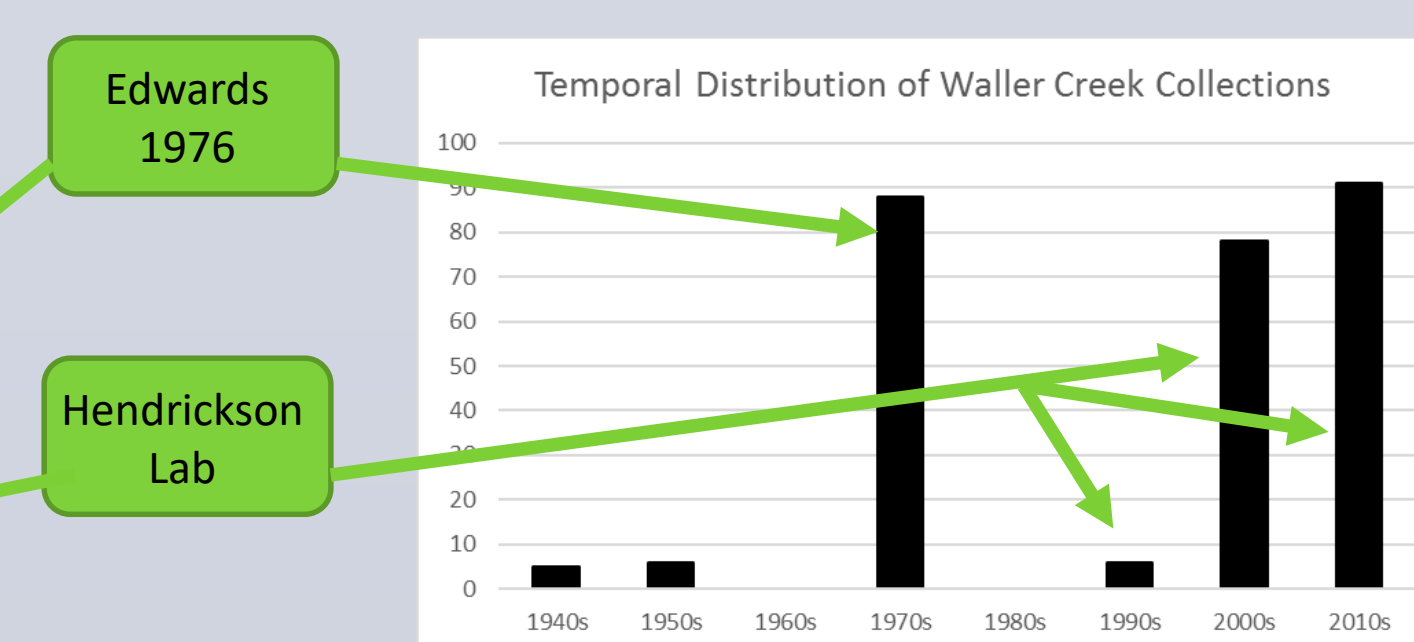
Results

The resulting fish occurrence dataset documents 21 species collected in 54 collecting events (on 17 dates at 27 sites). About 50 individuals or groups have participated in these collection that are from all parts of the creek from the mouth upstream to Denson Road, as well as Hemphill Branch and Central Market Pond. The first collection is from 1947, but the vast majority of data are from two distinct time periods (pre- and post-1980s). Though the most recent data are verifiable via specimens housed in UT's Biodiversity Collections, Edwards' 1970s collections were not vouchered by specimens.

Data origin

	pre-1980s	post-1980s	total
citizen/angler/other	1	2	3
federal agency	1		1
literature	86		86
museum	17	167	184
total	105	169	274

Temporal distribution



numbers are occurrence records (a species at a place and date)

List of Waller Creek Fishes

The complete species list for Waller Creek is provided below. It does not include individuals identified only to genus and excludes species collected only at the creek's mouth since many there are residents of Ladybird Lake only and do not extend upstream in the creek. Those excluded include: *Ctenopharyngodon idella* (Grass Carp), *Esox lucius* (Northern Pike), *Etheostoma lepidum* (Greenthroat Darter), *Fundulus notatus* (Blackstripe Topminnow), *Menidia beryllina* (Inland Silverside), *Micropterus treculii* (Guadalupe Bass), *Pomoxis annularis* (White Crappie), *Lepomis microlophus* (Redear Sunfish), *Lepomis gulosus* (Warmouth), *Notropis buccula* (Smalleye Shiner), *Percina macrolepida* (Bigscale Logperch), and *Pimephales vigilax* (Bullhead Minnow).

Species not native to the creek are highlighted, numbers are sums of collecting events (= number of times the species was collected in each date range). See www.fishesoftexas.org for more info on these species.

	pre-1980s	post-1980s	total
Centrarchidae	29	38	67
<i>Lepomis auritus</i> (Redbreast Sunfish)	1	1	2
<i>Lepomis cyanellus</i> (Green Sunfish)	11	19	30
<i>Lepomis humilis</i> (Orangespotted Sunfish)	1		1
<i>Lepomis macrochirus</i> (Bluegill)	1		1
<i>Lepomis megalotis</i> (Longear Sunfish)	12	17	29
<i>Micropterus salmoides</i> (Largemouth Bass)	3	1	4
Characidae	13	7	20
<i>Astyanax mexicanus</i> (Mexican tetra)	13	7	20
Cichlidae	5	9	14
<i>Herichthys cyanoguttatus</i> (Rio Grande Cichlid)	5	9	14
Cyprinidae	32	26	60
<i>Camptostoma anomalum</i> (Central Stoneroller)	13	18	31
<i>Carassius auratus</i> (Goldfish)	2	2	4
<i>Cyprinella lutrensis</i> (Red Shiner)	11	3	14
<i>Cyprinella venusta</i> (Blacktail Shiner)	3	1	4
<i>Dionda flavipinnis</i> (Roundnose Minnow)	1		1
<i>Notemigonus crysoleucas</i> (Golden Shiner)	1		1
<i>Pimephales promelas</i> (Fathead Minnow)	1	2	4
Fundulidae	2	2	2
<i>Fundulus zebrinus</i> (Plains Killifish)	2		2
Ictaluridae	1	1	1
<i>Ameiurus melas</i> (Black Bullhead)	1		1
Poeciliidae	15	51	67
<i>Gambusia affinis</i> (Western Mosquitofish)	13	25	38
<i>Gambusia geiseri</i> (Largespring Gambusia)	1		1
<i>Poecilia reticulata</i> (Guppy)	1		1
<i>Xiphophorus variatus</i> (Variable Platyfish)		26	27
total collections	100	131	231
total species	20	13	
N native species	13	8	
N non-native species	7	5	

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Introduced *Xiphophorus variatus* (Variable Platyfish)



Diversity of morphology (male and female) and coloration (after 3 days in formalin, so reds are faded).

- Native to central Mexico, first collected here in 2004 at 24th Street
- Now, 14 years later, it is abundant throughout the creek
- Not known from neighboring creeks
- Source unknown, but likely aquarium release
- Thought to be less cold tolerant and thus not likely to establish here, but has survived one of the coldest winters on record (2010) and has tolerated temperatures as low as 7°C in the lab
- Only known established population of the species in the United States (Cohen et al., 2014)
- Species used in cancer research and this could be an important population for researchers.
- Polymorphic tail spot patterns well documented, with expression of the various morphs tied to environmental conditions (Culumber, 2016).
- Temperature loggers now placed along the creek may be relevant to future research into this population.
- What's known about the Waller Creek population is published (Cohen et al., 2014)

Literature Cited

- Cohen, A.E., Dugan, L.E., Hendrickson, D.A., Martin, F.D., Huynh, J., Labay, B.J., Casarez M.J.. 2014. Population of variable platyfish (*Xiphophorus variatus*) established in Waller Creek, Travis County, Texas. Southwest. Nat. 59: 413-419. (doi:10.1894/MP-10.1)
- Culumber, Z. W., and M. Tobler. 2016. Spatiotemporal environmental heterogeneity and the maintenance of the tailspot polymorphism in the variable platyfish (*Xiphophorus variatus*). Evolution. 70:408-419.
- Edwards, R. J. 1976. Relative and seasonal abundance of the fish fauna in an urban creek ecosystem. Unpubl. MA Thesis, Univ. Texas, Austin. 83 pp.
- Hendrickson, D. A., Cohen, A. E. 2015. Fishes of Texas Project Database (version 2.0). Texas Advanced Computing Center, University of Texas at Austin. <http://doi.org/10.17603/C3WC70>. Accessed (May 1, 2018).
- Labay, B., Cohen, A.E., Sissel, B., Hendrickson, D.A., Martin, F.D., Sarkar, S. 2011. Assessing historic fish community composition using surveys, historic collection data, and species distribution models. PLoS ONE, 6: p. e25145