

## Allen Creek Fisheries

The fish community in Allen Creek is similar to many small to medium sized streams in the Lower Rock River Basin (1,857 square miles) and Southeast Glacial Plains Landscape (7.656 square miles). Most of the streams in this area are fairly diverse with eurythermal warmwater species prevalent. “A rich fish fauna are found in this part of the state, dominated by warmwater species in the families Cyprinidae, Catostomidae, Centrarchidae, and Percidae” (WDNR 2006). Many streams also support modest numbers of stenothermal cool water species such as brook stickleback and pearl dace. The majority of species in these streams are minnows representing the largest family of fish in North America (Cyprinidae).

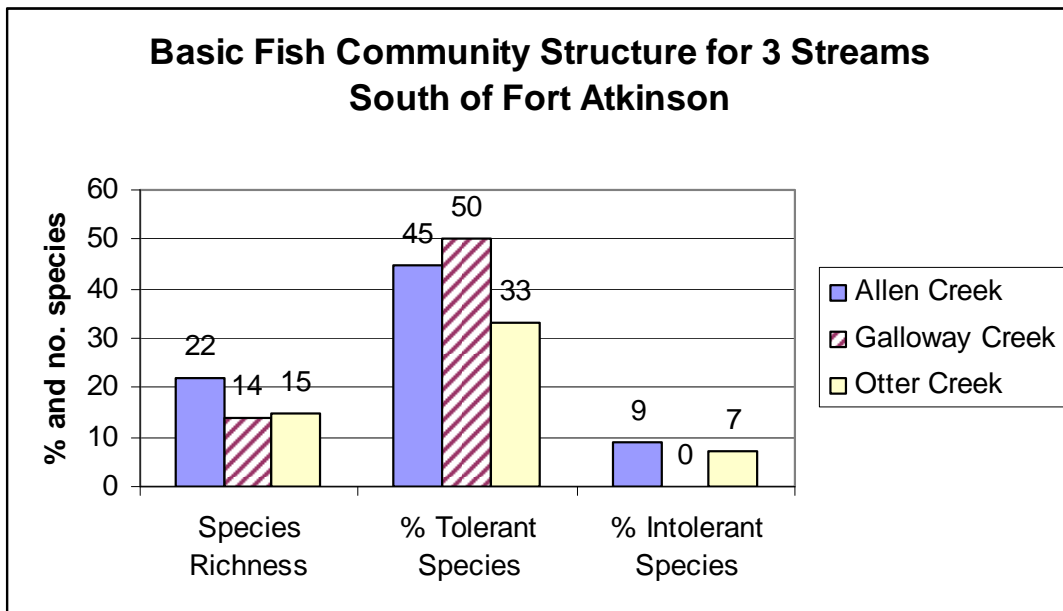
The Index of Biotic Integrity (IBI) is a common method for analyzing the environmental health of streams based on the resident fish communities. IBI scores in the Lower Rock River Basin generally fall within the “Fair” range indicating a moderate degree of environmental degradation (Lyons 1992). Most Lower Rock River Basin streams contain low numbers of intolerant species (some darters for example) and relatively high numbers of environmentally tolerant species, such as green sunfish and white sucker. Lower Rock River Basin streams have also exhibited a decline of simple lithophilous spawners or fish that need clean gravel to broadcast their eggs. Historic fish data and “least impacted” reference streams are often used to assess existing conditions of streams within a particular ecoregion and are also assessed as part of the IBI. The fish community changes reflect the cumulative impacts of wetland drainage, channel modifications, sedimentation and chemical pollution (WDNR 2001).

Fish populations in Allen Creek are similar to other nearby streams south of Fort Atkinson. Eurythermal species are dominant, including a substantial proportion of tolerant species that reflect agricultural and urban land uses in the area. Other species found in Allen Creek are colorful and exhibit interesting spawning behaviors. For example, the male hornyhead chub constructs spawning nests in the form of gravel mounds that are often shared with another species, a common shiner male.

Figure 1 compares fish community characteristics with two other similar sized streams in the Fort Atkinson area. The Wisconsin Department of Natural Resources had collected the fish community data as part of the baseline monitoring program. All fish sampling locations were randomly selected and sampled using either DC backpack or towed barge shockers. The length of stream sampled was a minimum of 35 times the mean stream width.

Allen Creek supports greater species richness compared with Otter Creek and Galloway Creek and greater diversity indicates favorable environmental health in warm water streams. Despite the high percentage of tolerant species in the stream, Allen Creek supports many of the important natural stream characteristics for this part of the state. Allen Creek is located within the Southeast Glacial Plains Landscape (Figure 2), an area of the state identified as a “Major Opportunity” for sustaining and enhancing natural stream communities (WDNR 2006). An important component of this natural stream community is the least darter. The least darter (*Etheostoma microperca*) is listed as a Species of Greatest Conservation Need and is also a State Species of Special Concern.

Figure 1: Comparison of basic fish community characteristics in three streams near Fort Atkinson. (WDNR baseline fish data).

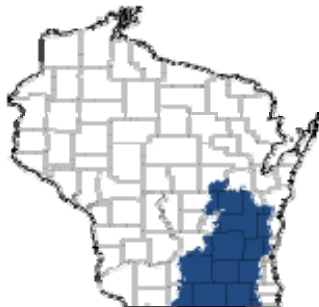


The least darter has been declining over its range (Becker 1983). Within the Lower Rock River Basin, it is rarely found in streams and had been more abundant in marl lakes, particularly in Waukesha County (Figure 3). The status of the least darter is currently unknown in Otter Creek and has likely disappeared from Lake Ripley. Least darters display a high affinity for aquatic vegetation and in Lake Ripley intensive shoreline development and herbicides applications undermined the habitat. The small darters are also very sensitive to sedimentation and chemical pollution, the reason they are rarer in streams. Expanded stream corridor buffers are often recommended to protect least darter habitat from urban runoff pollution.

The diverse habitats in Allen Creek and sustained favorable water quality continue to support least darters and relatively high biodiversity of fishes. Becker (1983) describes the important habitat conditions that least darters require in streams. *The least darter is encountered most frequently in clear water at moderate to warm temperatures, at depths of 1.5 m or less, over substrates of gravel (39%), sand (23%), silt (15%), boulders (8%), and mud (8%). It is typically found in quiet water within dense vegetation.* While the low gradient sections appear to favor least darters in Allen Creek as elsewhere, the alternating reaches of higher gradient enhance overall species richness in the stream.

Figure 2: Wisconsin Wildlife Action Plan map encompassing Allen Creek

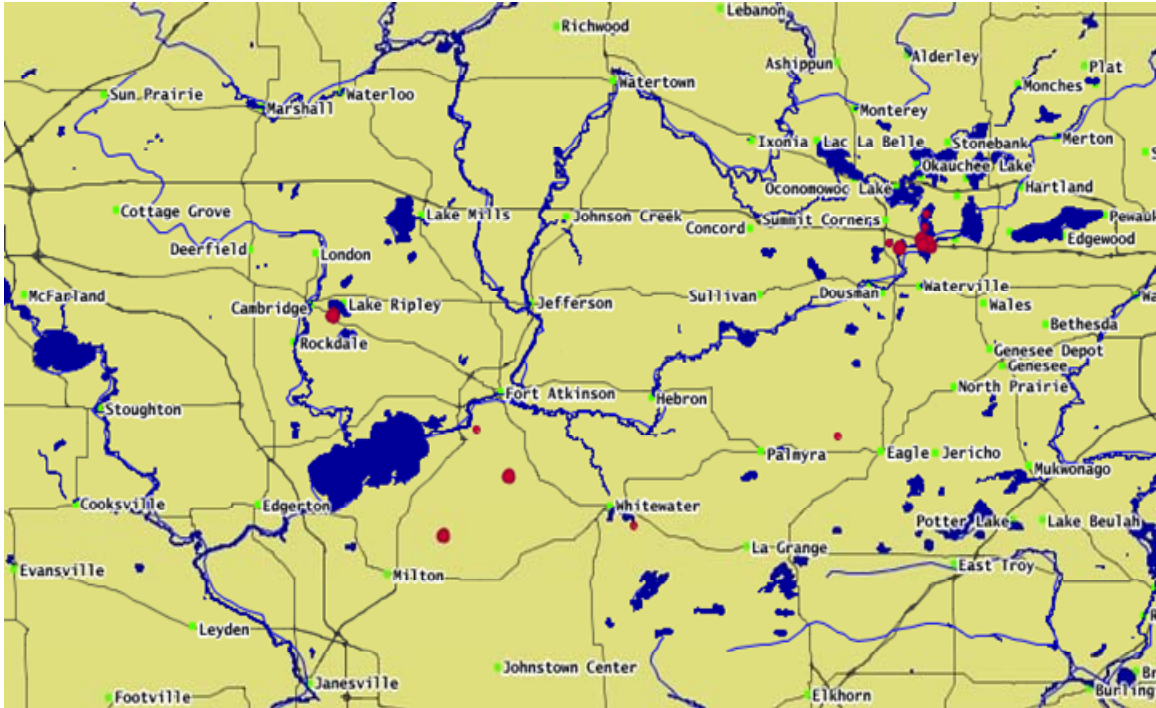
### Southeast Glacial Plains Landscape



The Least darter is significantly associated with this Ecological Landscape, restoration of this Ecological Landscape would significantly improve conditions for the species.

Figure 3: Distribution of the least darter in the Lower Rock River Basin

## Historic Least Darter Distribution (red dots)



United States Geological Survey. 2005. Great Lakes Gap and WDNR Fish Mapping Application.

The sustained relatively high species richness, including the presence of least darters (Table 2) and stream location within the Southeast Glacial Plains Landscape, provide highly favorable conditions for a stream protection/enhancement project. Protecting least darters in warmwater streams within this ecological landscape is considered important in the State Wildlife Action Plan. Table 1 lists the Species Assessment Scores for the least darter, reflecting the relatively high priority for protection.

Table 1: Species Assessment Scores for the least darter

<b>State Rarity</b>	<b>3</b>
<b>State Threat</b>	<b>4</b>
<b>State Population Trend</b>	<b>4</b>
<b>Global Abundance</b>	<b>3</b>
<b>Global Distribution</b>	<b>4</b>
<b>Global Threats</b>	<b>4</b>
<b>Global Population Trend</b>	<b>3</b>
<b>Mean Risk Score</b>	<b>3.6</b>
<b>Area of Importance</b>	<b>3</b>

The definition for the State Rarity score is: *rare in Wisconsin*. The definition for the State Threats score is: *severe deterioration in the future suitability of least darter breeding conditions is expected*. The definition for the State Population Trend score is: *possible or moderate least darter population decrease over the past 30 years*. The definition for the Global Relative Abundance score is: *occurs in moderate relative abundance*. The definition for Global Distribution score is: *distribution area occupied is 1/4 of the continent*. The definition for Global Threats score is: *severe deterioration in the future suitability of breeding conditions is expected*. The definition of Global Population Trend score is: *uncertain population trend over the past 30 years*. The Mean Risk score for the least darter is: 3.6 (1 the lowest and 5 the highest assessed conservation need). The Area of Importance score is: *high, species is significantly associated with the Southeast Glacial Plains Landscape; restoration of this Ecological Landscape would significantly improve conditions for the least darter*.

Table 2: Allen Creek fish species collected as part of the Fish Distribution Survey (1975) and more recent baseline survey (2003)

Species	Scientific Name	Feeding	Enviro. Tolerance	1975	2003
Northern pike	<i>Esox lucius</i>	Top carnivore	-	X	X
Central mudminnow	<i>Umbra limi</i>	Insectivore	Tolerant	X	X
Central stoneroller	<i>Campostoma anomalum</i>	Herbivore	-	X	X
Common carp	<i>Cyprinus carpio</i>	Omnivore	Tolerant, exotic		X
Brassy minnow	<i>Hybognathus hankinsoni</i>	Herbivore	-	X	X
Hornyhead chub	<i>Nocomis biguttatus</i>	Insectivore	-	X	X
Golden shiner	<i>Notemigonus crysoleucas</i>	Omnivore	Tolerant		X
Common shiner*	<i>Luxilus cornutus</i>	Insectivore	-	X	X
Bigmouth shiner	<i>Notropis dorsalis</i>	Insectivore	-	X	
Spotfin shiner	<i>Cyprinella spiloptera</i>	Insectivore	-		X
N. redbelly dace	<i>Phoxinus eos</i>	Herbivore	-	X	X
S. redbelly dace*	<i>Phoxinus erythrogaster</i>	Herbivore	-	X	X
Bluntnose minnow	<i>Pimephales notatus</i>	Omnivore	Tolerant	X	X
Fathead minnow	<i>Pimephales promelas</i>	Omnivore	Tolerant	X	X
Blacknose dace*	<i>Rhinichthys atratulus</i>	Generalist	Tolerant	X	X
Creek chub	<i>Semotilus atromaculatus</i>	Generalist	Tolerant	X	X
Pearl dace	<i>Margariscus margarita</i>	Insectivore	-	X	X
White sucker	<i>Catostomus commersoni</i>	Omnivore	Tolerant	X	X
Black bullhead	<i>Ameirus melas</i>	Insectivore	-		X
Stonecat	<i>Noturus flavus</i>	Insectivore	-	X	X
Brook stickleback	<i>Culaea inconstans</i>	Insectivore	-	X	X
Green sunfish	<i>Lepomis cyanellus</i>	Insectivore	Tolerant	X	X
Smallmouth bass	<i>Micropterus dolomieu</i>	Top carnivore	Intolerant		X
Largemouth bass	<i>Micropterus salmoides</i>	Top carnivore	-		X
Rainbow darter*	<i>Etheostoma caeruleum</i>	Insectivore	Intolerant	X	
Fantail darter	<i>Etheostoma flabellare</i>	Insectivore	-	X	X
Least darter	<i>Etheostoma microperca</i>	Insectivore	Intolerant	X	X

Johnny darter	<i>Etheostoma nigrum</i>	Insectivore	-	X	X
Logperch*	<i>Percina caprodes</i>	Insectivore	-	X	

\* indicates simple lithophilous spawners

### Summary and Recommendations

Allen Creek is a relatively diverse warm water stream located in the Lower Rock River Basin and Southeast Glacial Plains Landscape. While the stream exhibits some degree of degradation based on IBI indicators, Allen Creek still sustains many important ecological characteristics that include moderately high species richness and presence of least darters, a Species of Greatest Conservation Need. The apparent stable population of least darters in Allen Creek and location within the Southeast Glacial Plains Landscape indicates that the stream is a solid candidate for corridor protection/enhancement efforts including State Wildlife Grant, River Protection Grant and similar projects.

### References

- Becker, G. C. 1983. Fishes of Wisconsin. The University of Wisconsin Press.
- Fago, D. 1992. Distribution and relative abundance of fishes in Wisconsin. WDNR Technical Bulletin No. 175.
- Lyons, J. 1992. Using the index of biotic integrity (IBI) to measure environmental quality in warmwater streams of Wisconsin. United States Department of Agriculture General Technical Report NC-149.
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