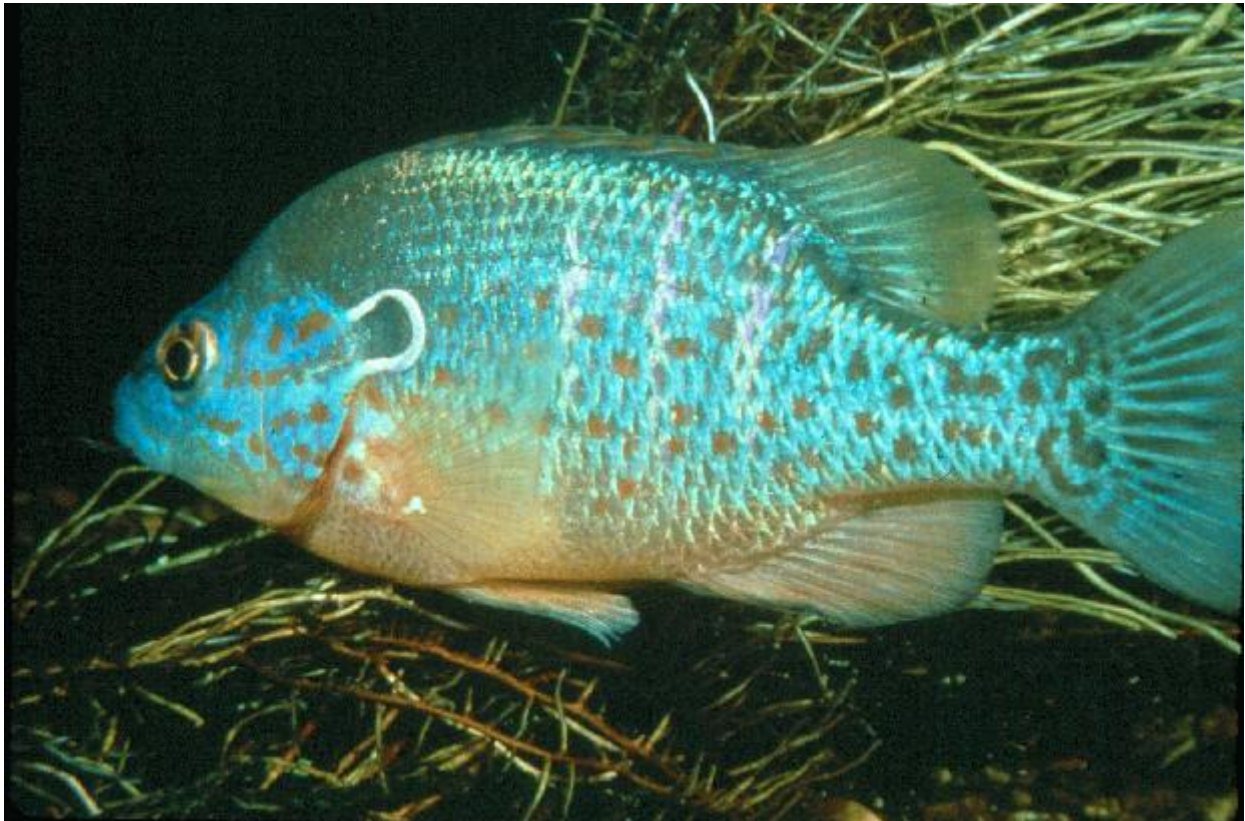




Region II Streams Office
5931 Fox River Drive
Plano, Illinois 60545

Winfield Creek Biological Survey

September 10 and 12, 2002



January, 2004
Robert C. Rung and Stephen M. Pescitelli

Cover Photo: Orangespotted sunfish (*Lepomis humilis*) by William Rosten

Acknowledgments

The Illinois Department of Natural Resources' Region 2 Streams Office is deeply indebted to the Wheaton Park District personnel, who gave generously of their time. Thanks to: Rob Sperl, John Pence, Aaron Bruney, and Jill Voegtle for their assistance with this survey. Rob Sperl was especially notable for his contribution during both the station selection and sampling phases of the survey. Rob greatly facilitated the selection of stations by developing a comprehensive list of potential station locations, and he assisted with the reconnaissance and sampling.

Summary

During September, 2002, fish population sampling was conducted at four stations on the main stem of Winfield Creek in the Villages of Wheaton and Winfield. Sampling resulted in the collection of 2,165 fishes representing 17 species. Analysis of sampling data yielded Biological Stream Characterization (BSC) ratings of "Restricted Aquatic Resource" for two stations, and "Limited Aquatic Resource" for the other two stations (Bertrand, et al, 1996). The low ratings appear to reflect degraded habitat, although water quality was not evaluated during this survey.

Introduction

A fish population survey of Winfield Creek was conducted in September, 2000 in response to a request by the Wheaton Park District for baseline fish data for Winfield Creek. Winfield Creek, a small tributary to the West Branch of the DuPage River, had not previously been sampled by the Illinois Department of Natural Resources. The watershed is entirely urban, and the stream has three, constructed, on-line impoundments; two in Community Park, and one in Northside Park. A proposed stream restoration project would separate Winfield Creek from the lowest impoundment, Northside Park Lagoon in Wheaton. The baseline data will provide an opportunity to compare and contrast fish communities before and after implementation of stream restoration activities.

Methods

Fish population sampling was conducted on September 10 and 12, 2002 at four stations selected to represent the range of habitat types available for Winfield Creek (Figure 1, Table 1). Station WFC-3, located in the Lincoln Marsh reach downstream of the Northside Park Lagoon was sampled using a 9-meter (30 ft.) electric seine, powered by a single-phase, 1600 watt generator (Bayley et al. 1989). The electric seine was used at this station due to the width (approximately 30 feet) and depth (approximately 2 feet deep). The upstream and downstream limits of WFC-3 were blocked by nets to prevent fish escape during sampling. Stations WFC-1, WFC-2, and WFC-4 were narrower (Table 3), and shallower (average depth approximately one foot). These stations were sampled utilizing a back-pack mounted, 110 volt generator powered electro-fishing unit. Sampling times and station length varied based on complexity of the habitat and channel characteristics. For station location information refer to Table 1.

Table 1. Winfield Creek Fish Population Survey Station Locations, DuPage County

Sta #	Station Location	Twnshp Range Sec	Latitude (N)	Longitude (W)
WFC-1	In Winfield, upstrm (E) of Church St. bridge, adjacent St. John's Church.	T.39N R.9E N 13	41° 52' 5.9"	88° 9' 22.3"
WFC-2	Wheaton, S of Rt 38, at St. Francis HS (athletic fields) apprx 300' E of field access trail bridge.	T.39N R.10E N 19	41° 51' 15"	88° 8' 26"
WFC-3	Wheaton, Northside Park, dwnstrm (S) from Lagoon in Lincoln Marsh. Reach is N of Gary Ave.	T.39N R.10E SE 8	41° 52' 37.9"	88° 6' 55.6"
WFC-4	Wheaton, Northside Park, upstrm (N) from Lagoon, reach S of Main St..	T.39N R.10E NW 9	41° 52' 56.6"	88° 6' 32.3"

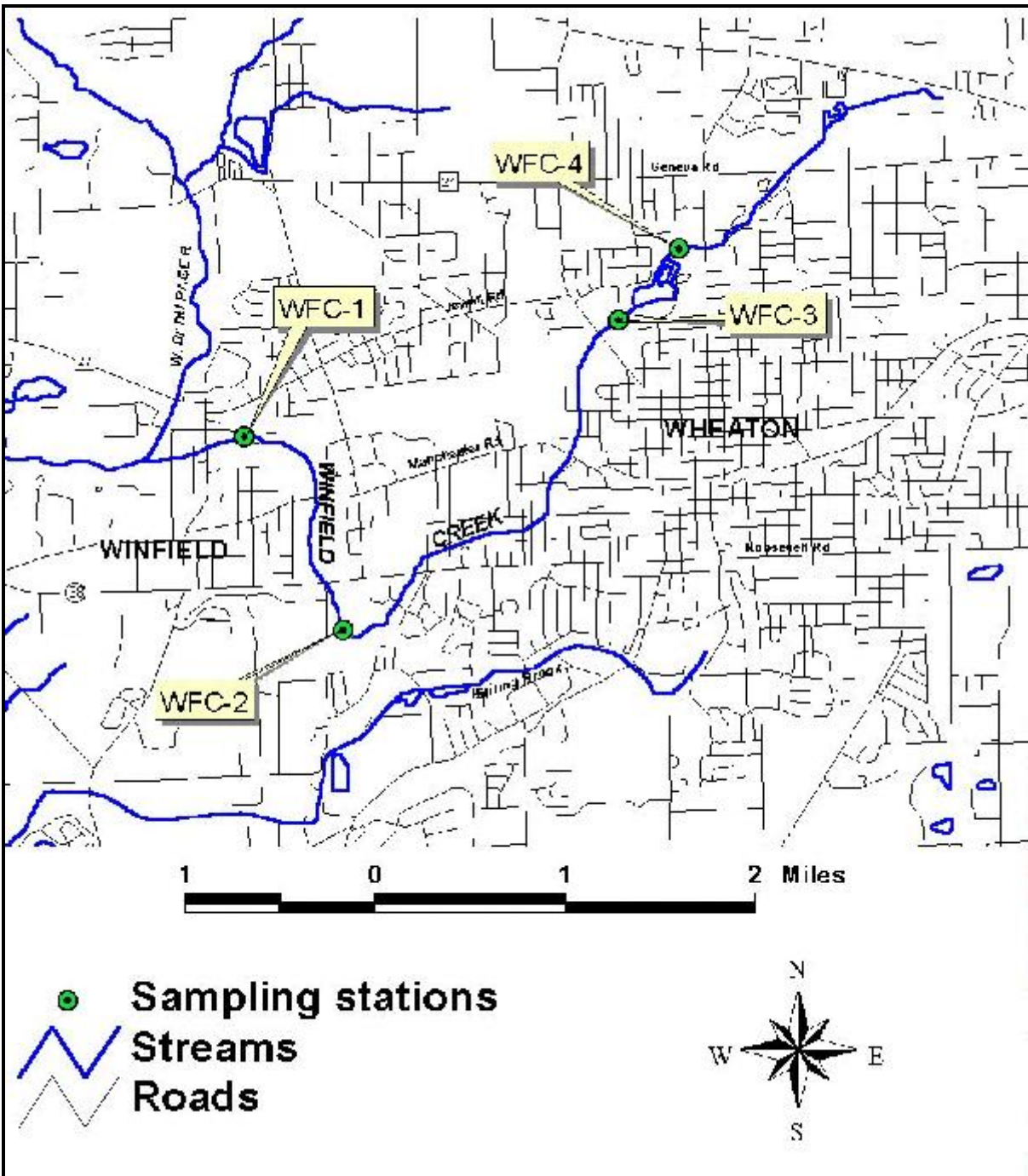


Figure 1. Winfield Creek fish sampling stations for 2003 survey.

Upon completion of electro-fishing, larger fish specimens (other than a voucher specimen of each species) were weighed, measured and returned to the stream. Smaller individuals were preserved and identified in the laboratory. Species composition at each station was utilized to calculate an Index of Biotic Integrity (IBI, Smogor 2000). The IBI is a widely used stream quality measurement based on the fish community, taking into account the number and types of species present, their food, habitat, spawning preferences, and tolerance to degradation. These attributes are evaluated using 10 different parameters, or metrics, each with a possible score of 0-6, based on comparison to established reference conditions for unmodified streams. Total IBI scores range from 0-60, with higher scores indicating better quality (Individual metric scores and totals for each station are found in Table 4). The IBI is the basis for determining the letter-based Biological Stream Characterization (BSC, Bertrand et al. 1996, Table 2).

Table 2. Biological Classification of Illinois Streams

Resource Description >	Unique Aquatic Resource	Highly Valued Aquatic Resource	Moderate Aquatic Resource	Limited Aquatic Resource	Restricted Aquatic Resource
Biotic Class >	A	B	C	D	E
IBI range >	51 - 60	41 - 50	31 - 40	21 - 30	≤ 20

Results and Discussion

Fish population sampling resulted in the collection of 2,165 fishes representing 17 species and two hybrids (Table 3). The sample consisted of 15 native species, one north American species that is well out of its native range (mosquito fish, *Gambusia affinis*), and one non-native species (common carp, *Cyprinus carpio*). All species collected fell into the trophic category of generalist feeders. Generalist feeders are omnivorous species that utilize nearly any organic matter for food. Fish that eat exclusively invertebrates (invertivores) were absent in the Winfield Creek samples. Invertivore species are considered an indicator of good habitat and water quality (Smogor, 2000). Fish species and hybrids that are considered tolerant of degradation (Smogor, 2000) represented 52% (n=10) of fish species collected. Orangespotted sunfish (*Lepomis humilis*), recognized for its wide ecological tolerance (Smith, 1979), was the most numerous species (n=867), and were collected at every station. Orangespotted sunfish abundance, when combined with the second most numerous species, bluegill (n=455) represented over half (61%) of all fish collected during the survey. The dominance of these two species reflects low quality habitat and low species diversity. Eight species, gizzard shad, common carp, golden shiner, white sucker, black bullhead, black crappie, largemouth bass, and bluegill, were collected predominately or exclusively at only one station, WFC-3; downstream of the Northside Park Lagoon. Fish abundance at station WFC-3 (n=1,609) represented nearly three-quarters (74%) of all fish collected during the entire survey. Fish abundance at WFC-3 reflects the width and depth of the stream at this location and its proximity to the lagoon, and other impoundments in the watershed. Three species were strongly represented at all four stations; orangespotted sunfish, green sunfish, and mosquitofish. Largemouth bass were represented at all stations, but were present only in very small numbers (1 or 2) at each station other than WFC-3 (Table 3).

Table 3. Winfield Creek Fish Population Survey - September, 2002

Common name	Scientific name	Total	09/12/02	09/12/02	09/10/02	09/10/02
			WFC-1	WFC-2	WFC-3	WFC-4
Gizzard shad	Dorosoma cepedianum	52	0	1	51	0
Common carp	Cyprinus carpio	69	0	0	69	0
Carp x Goldfish hybrid	Cyprinus carpio x Carassius auratus	1	0	0	1	0
Golden shiner	Notemigonus crysoleucas	104	0	1	102	1
Creek chub	Semotilus atromaculatus	4	4	0	0	0
Spotfin shiner	Cyprinella spiloptera	4	4	0	0	0
Fathead minnow	Pimephales promelas	4	0	2	0	2
Bluntnose minnow	Pimephales notatus	85	80	5	0	0
Sand shiner	Notropis ludibundus	6	6	0	0	0
White sucker	Catostomus commersoni	19	1	0	18	0
Yellow bullhead	Ameiurus natalis	2	2	0	0	0
Black bullhead	Ameiurus melas	58	0	1	57	0
Mosquitofish	Gambusia affinis	212	11	134	19	48
Black crappie	Pomoxis nigromaculatus	2	0	0	2	0
Largemouth bass	Micropterus salmoides	40	2	1	36	1
Green sunfish	Lepomis cyanellus	164	52	27	77	8
Bluegill x Green sunfish hybrid	Lepomis macrochirus x L. cyanellus	17	1	0	12	4
Bluegill	Lepomis macrochirus	455	0	15	438	2
Orangespotted sunfish	Lepomis humilis	867	47	77	727	16
Total fish		2165	210	264	1609	82
Total species		17	10	10	11	7
IBI			19	20	22	22
BSC			E	E	D	D

Table 4. Winfield Creek Individual Station Metric Scores for determination of (IBI)⁽¹⁾, and (BSC)⁽²⁾.

Metric (Criteria)	Station Code>>>	WFC-1	WFC-2	WFC-3	WFC-4
	Sample Date>>>	09/12/02	09/12/02	09/10/02	09/10/02
		# or % Score	# or % Score	# or % Score	# or % Score
Number of native fish species		10 3	10 3	10 2	7 2
Number of native sucker species		1 2	0 0	1 2	0 0
Number of native sunfish species		3 6	4 6	5 6	4 6
Number of native intolerant species		0 0	0 0	0 0	0 0
Number of native minnow species		4 3	3 3	1 1	2 2
Number native benthic invertivore sp		0 0	0 0	0 0	0 0
% specialist benthic invertivores		00 0	00 0	00 0	00 0
% generalist feeders		69 3	20 6	51 5	16 6
% coarse substrate spawners		00 0	00 0	00 0	00 0
% tolerant species		64 2	13 2	17 6	13 6
IBI ⁽¹⁾		19	20	22	22
BSC ⁽²⁾		E	E	D	D
Stream Width (ft)		13	10	30	9

(1) Index of Biotic Integrity (IBI) Smogor, 2000

(2) Biological Stream Characterization (BSC) Bertrand et. al. 1996

IBI values calculated for Winfield Creek stations exhibited a very narrow range (IBI=19 to 22, Table 4) indicating a similar level of habitat degradation at each of the stations. The uniformly low IBI values are a result of low fish abundance, low species diversity, and the absence of invertivore species. Minimal diversity and dominance by generalist species reflects poor habitat and conditions throughout Winfield Creek. Additionally, recruitment of fish from the nearby West Branch Dupage River (a potential source of species) may be restricted by a railroad culvert at Manchester Road. It appears that habitat is the principal limiting factor for the Winfield Creek fish population. Water quality was not evaluated during this survey. A macroinvertebrate population survey would provide information on water quality in Winfield Creek.

REFERENCES

- Bayley, R.R., R.W. Larimore and D.C. Dowling. 1989. Electric seine as a fish sampling gear in streams. Transactions of the American Fisheries Society 118:447-453
- Bertrand, W.A., R.L. Hite and D.M. Day. 1996. Biological Stream Characterization (BSC): Biological Assessment of Illinois Stream Quality through 1993. Illinois Environmental Protection Agency. IEPA/BOW/96-058. Springfield Illinois.
- Smogor, R. 2002. Draft manual for Calculating Index of Biotic Integrity Scores for Streams in Illinois. Illinois Environmental Protection Agency, Bureau of Water, Springfield Illinois.
- Smith, P. W. 1979. The Fishes of Illinois. Univ of Illinois Press. ISBN 0-252-07084-4